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BIOLOGICAL THOUGHT AND CHEMICAL THOUGHT

A PLEA FOR UNIFICATION *

BY SIR FREDERICK GOWLAND HOPKINS, O.M., F.R.C.P., F.R.S.

PROFESSOR OF BIOCHEMISTRY IN THE UNIVERSITY OF CAMBRIDGE

(*Concluded from p. 1150*)

I HAVE so far put before you in barest outlines a few cases illustrating at least the kind—though by no means the extent—of our knowledge concerning mechanisms without which every biological unit would be a static instead of a dynamic system, and a dead system rather than a live one. We have much more to learn concerning the precise nature of intracellular enzymes and their mode of action, but I am sure we are on the right path for reaching that knowledge, and I will again remind you that I myself belong to a generation which began with little or no understanding of such mechanisms; to one like myself the knowledge we now possess seems quite newly won and remarkable even in its present extent.

The aspect of biocatalysis which I will finally emphasise is its specificity, which, though not absolute, is a quality persistently revealed by experiment. Whatever theory of enzyme action we may hold it is sure that the primary happening is the formation of an association between catalyst and substrate, involving some definite relation between structure in or on the former and the molecular structure of the latter. It is this dominant influence of molecular structure in living systems that I now wish to illustrate further.

I remember that not many years ago a well-known biologist claimed, in a book dealing with cytology, that as protoplasm cannot be an ordinary chemical compound it can exhibit no molecular structure in the sense understood by the chemist. I used not infrequently to hear somewhat similar views expressed. The former part of the above claim is undoubtedly true. The use of the term protoplasm may be morphologically justified, but chemically it denotes an abstraction. It is sure that it is made up of parts in which the influence of molecular structure as understood by the chemist is all potent.

You will, I think, all realise that when physiologists revealed the existence and functions of hormones they not only gave increased opportunities for the activities of biochemists but in particular gave a new charter to biochemical thought, and with the discovery of vitamins that charter was extended. I would suggest also that the revelation of what we have come to know as the humoral transmission of nerve impulses is a confirmatory clause in that charter, and such, no less, is the recognition of "organiser" functions in the realm of embryology.

We have gradually come to learn the nature of a number of substances of relatively small molecular weight, not forming part of the colloidal structures of the tissue, though able to establish temporary relations with these, but existing in true aqueous solution, and so capable of transport in the aqueous phases of individual cells, or in the circulatory fluids of animals and the sap of plants. We know that the properties of each one of these—and they are surprisingly many—may make its influence absolutely essential for the normal progress and organisation of events in this or that living tissue. In their absence disorganisation follows. Characteristic of all these agents is that they function efficiently in amounts which are extraordinarily small.

HUMORAL TRANSMISSION OF NERVE IMPULSES

I will first call your attention to the phenomenon I referred to as the humoral transmission of nerve impulses. It is of exceptional interest and highly significant for my theme. The control of tissue activities by the nervous system had long seemed to involve influences quite remote from any so strictly chemical as that due to specific molecular structure. However little we knew about the precise nature of the nerve impulse itself, it seemed sure that some transmitted change largely physical in nature reached a tissue from the nerve, and there, though possibly modified in some way at the nerve-ending, directly affected the equilibrium of the tissue. To-day we know that definite chemical happenings intervene. The arrival of the nerve impulse involves the liberation in the innervated tissue of specific chemical substances, and it is to molecular properties inherent in these that the tissue directly reacts. We have gradually learnt this first from suggestions contained in pioneer studies by T. R. Elliott, followed by the brilliant researches of Otto Loewi, and now by recent and more remarkable extensions in the field due to H. H. Dale and his colleagues.

What we know to-day is briefly this: The impulses carried by nearly all the efferent neurones of the peripheral nervous system liberate in the tissues the substance acetylcholine; the exceptions being those carried by the post-ganglionic fibres of the true sympathetic system; but these liberate, alternatively, adrenaline. It is the special chemical nature of these two relatively simple substances that determines the effects observed on stimulation of peripheral nerves and constitutes a link between events in the nerve and events in the tissues.

With the discovery of these facts chemistry made an unexpected and impressive appearance in the physiological arena, and not less impressive was its entry into that of embryology when the so-called "organiser" of Speeman was discovered. It then became known that during the growth of an embryo the direct influence of a particular group of cells at the gastrula stage of development in some way induced the progress of further stages. These cells, if taken from one embryo and transferred to some locality in another, exercise their normal influence there, so that in the host certain structures are duplicated. It was striking enough when the proof came that this influence was chemical; an extract from the cells in question producing exactly the same highly specific results as the presence of the intact cells. To this story the work here in Cambridge of Drs. Waddington and Needham has contributed much.

HORMONES AND VITAMINS

I turn next to the influence of the more typical hormones and of vitamins. There is little justification for making any sharp distinction between them. In different species they have different origins, but their functions seem to be similar in essentials. I cannot

* The Linacre lecture for 1938 delivered at Cambridge on May 6th.

of course attempt here any general discussion of their constitution or their individual functions, nor is this necessary for my purpose, though I will presently, with a particular intention, briefly indicate some relations between constitution and function in the case of a few. In the accompanying illustration I have ventured to assemble the structural formulæ of all these influential molecules so far as they are known (some dozen in all), not wishing however that the significance of structural details should trouble those who are not organic chemists but solely to make clear to the eye what for my present theme is so important—namely, the circumstance that great diversity of function goes with a corresponding diversity of structure. It should be remembered that the influence of substances, potent in function while infinitesimal in amount, is not confined to the tissues of the higher animals. Some micro-organisms at least need what may fairly be called a vitamin supply in their growth medium; hormones necessary for growth, of which the chemical nature is now known, function in plants; and some cases of similar influences have been brought to light in the economy of invertebrates, especially interesting being that of certain insects in which growth and metamorphosis are conditioned by hormones produced by a gland situate in the head (Wigglesworth). Such functions it would seem enter widely into the scheme of Nature.

To determine just how these substances exert their potent influence is an immediate task for the biochemist. It is no simple task and has only recently revealed itself as an urgent scientific duty. It has therefore not yet gone far. It is I think sure in advance that their indispensability must be due to the circumstance that like enzymes (though on different lines) they play a dominant part in maintaining the due progress of dynamic events. We have at least some direct evidence for this.

As many here will know, when a man or animal is deprived of a supply of vitamin B_1 the primary effect is disorganisation of events in the nervous system. Now during the stages involved in the normal breakdown of carbohydrate in the organism the substance pyruvic acid makes a significant appearance. Prof. Peters at Oxford has shown that the brain tissue of an animal which has suffered from a deficiency of this vitamin, unlike the healthy brain, is unable to deal normally with pyruvic acid, which therefore accumulates in the tissue. Experiments in vitro show that most minute amounts of the vitamin, acting perhaps in some essential combination, restore the power of brain tissue and other tissues which lack it, to decide the fate of pyruvic acid. This and other evidence indicates that one function of vitamin B_1 is to play an important part in the control of carbohydrate metabolism.

It has recently been revealed in dramatic fashion that the dire disease pellagra, so prevalent in certain countries, is due to the lack of a substance which has a relatively simple constitution—namely, nicotinic acid. In most minute amounts this can prevent or cure the most severe symptoms of this disease. Nicotinic acid must now be placed in the category of essential vitamins. I will here ask you to recall what I said about the functions of co-enzymes as contributing to the transference of hydrogen to oxygen. Now to the relatively complex structure of co-enzymes the structure of nicotinic acid contributes, forming that part of the whole molecule which is directly concerned in the transport of hydrogen. It would seem as though the ring structure of nicotinic acid is one which the tissues cannot synthesise, though it has important and biochemical functions to perform. It must therefore be supplied in the food. Again there is a vitamin, B_2, or lactoflavin, which is known to be necessary for animal growth. The molecule of this also contains a special ring structure—the alloxazine ring—which again the tissues seem unable to synthesise; hence the need of this vitamin. Now when in metabolism lactoflavin becomes linked up with a specific protein, it also plays, at least in certain cases, a notable part in hydrogen transport, the alloxazine ring being the essential carrier. These few cases show that the influence of vitamins may be exerted amid the dissimulative events which liberate energy; perhaps in the laboratory we have so far only found it in such connexions because it is chiefly there we have looked for it. It seems to me sure however, since a lack of any one among hormones and vitamins involves such profound and specific effects on tissue cells in the animal body, that their influence in a chemical sense goes deeper than this, and is somehow concerned with the organisation of reactions in the tissues. In some key positions they must exert a wide control over events.

I have put many facts before you, but they are a very small sample of those available with similar bearings. Many are facts of an order or kind which not so many years ago would have seemed beyond our power to reveal. What for the moment I would emphasise is that they are so frankly chemical that only chemical language can deal with them. Will any intellectual synthesis ultimately make easy a translation into biological terms? What degree of such synthesis may we hope for in the future?

STUDY OF EVENTS IN ISOLATION

I have more than once referred to "organisation." The very word gives pause to the biochemist. If his ultimate aim is to describe adequately a living system in chemical terms, he must face the fact that he is proposing to explore a field in which chemical events are organised with a complexity not thought of in the development of classical chemical science. There are doubtless "higher" levels of organisation in the description of which chemical language can take no direct part. But if we speak of higher and lower levels, we must not do so with the assumption that one is more important than another.

Description at any one level alone will be found to have inherent limitations. At the chemical level many recent studies, apart from those on micro-organisms, have been made on intact tissue cells during true survival life in vitro; but those which have thrown most light on the nature of the controlling mechanisms have involved the isolation of such mechanisms. We have isolated nevertheless not structural materials alone but events in progress, events proceeding in space and time, and therefore, as samples, retaining something at least of the nature of the whole. We realise of course that events studied in isolation may be modified when proceeding in the environment of the whole. Our methods of isolation do not, however, create artefacts, though they may lead us to study potentialities rather than actualities. It is part of our task, present and future, to distinguish the latter amid the former.

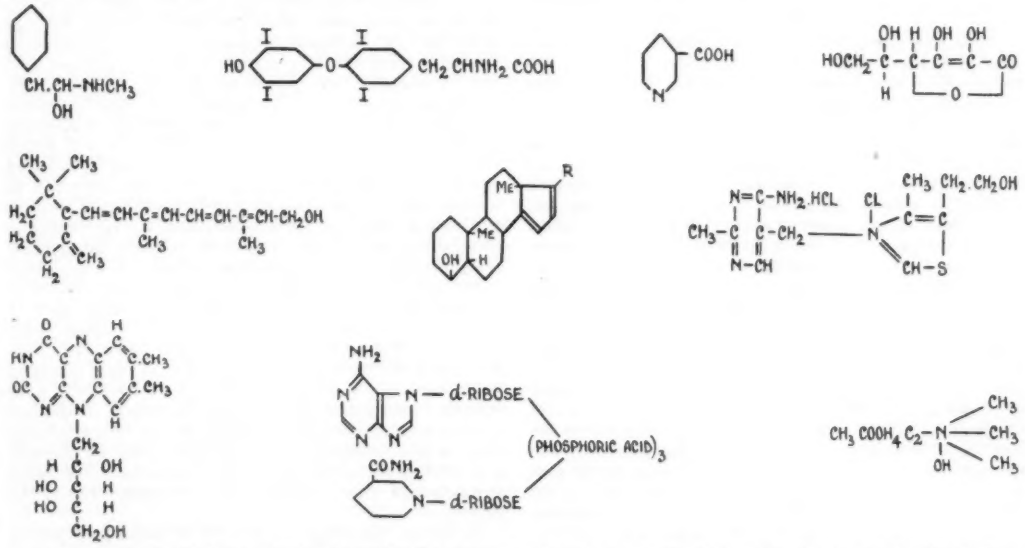
Let it be frankly admitted that biochemical studies have still before them, save in small, though not negligible, part, what I will again claim as their legitimate aim and major task—the endeavour namely to describe biochemical events from the standpoint of their organisation during life. If and when such effort succeeds, and only then, we shall

know just how far chemical thought can reach towards a full description of any living unit. Many, and, I think, most to-day, believe that the full description will call in addition for thought of another kind. Nevertheless at any one level of organisation description may have its own measure of completeness.

With regard once more to the present position of biochemistry, let me again remind you that it is only during the last few decades that its pursuits have revealed something of the nature of the individual events which must share in the organisation, and made clear how great is their number. Progress is accelerating and a young science need not fear the law of diminishing returns. Moreover as a borderland science, apart from its own momentum, it is constantly gaining impetus and fresh opportunities from advances made on each of its frontiers. Especially is this true at the present moment.

that their thought about the living cell must be mutually exclusive; may they not rather, without either losing its own special character, prove eventually helpful, and even essential each to the other?

I was a little disconcerted when asked, after the title of this lecture was announced, how I would define biological thought for my purpose, for it has many varieties. What I meant by it as applied in the particular field which I have made the special concern of this lecture, is such thought about a living unit which ignores, or minimises the importance of, those molecular events which must underlie the visible manifestations of its life; an attitude of mind often based perhaps on a doubt whether any attempt to correlate the molecular with the visible is within the competence of experimental science. Let me add that I have met the same doubt in the minds of some few highly competent chemists. Their view



Above are assembled the structural formulæ of a group of substances each of which, owing to its specific chemical nature, plays some dominant part in maintaining the integrity and due progress of dynamic events in living organisms. They are assembled not for insistence on the significance of structural details but only to make clear to the eye how great diversity of function is associated with equal diversity of constitution.

(1) Adrenaline; (2) thyroxine; (3) nicotinic acid; (4) vitamin C; (5) vitamin A; (6) calciferol, one form of vitamin D, the sterol ring system here shown is also the basic structure of the sex hormones; (7) vitamin B_1; (8) vitamin B_2; (9) co-enzyme II; (10) acetylcholine.

BIOCHEMISTRY AND BIOLOGY

I chose for this lecture an ambitious title which needs some excuse. You will have realised by now that its terms were meant to apply to a field for thought which, though surely all important and one which, occasionally at least, must occupy the mind of every biologist, is yet, for discussion, a limited one. There are of course, and always will be, great fields of biological endeavour, where no direct contacts with chemical thought are sought or called for; there are equally wide fields where chemical endeavours have no concern with biological thought. It is especially for those who feel an irresistibly strong desire to learn what can be known about the fundamental nature of living stuff, to realise that here two modes of thought make immediate contact. As Prof. James Gray has said, "cytology may rightly claim to be the frontier state in the biological commonwealth, for within its borders biologists and chemists find common ground." Are their differences such is that biochemistry should endeavour to follow every path that will lead to utility. Such paths are many and open; let us, they say, do what we know we can do and not follow a will-o'-the-wisp. I cannot agree with this view.

There are however biologists who, with none but friendly feelings for biochemical effort, and by no means excluding its results from their thoughts, yet so fully realise the complexities their own work continues to reveal that they instinctively recoil from chemical approaches that seem too facile.

There is one who, I know, sometimes feels this whose opinion all very greatly respect and value. I mean our own professor of zoology. In his admirable book on experimental cytology, to which I personally owe much, Prof. Gray, while displaying full sympathy with biochemical endeavour, to which indeed he has himself contributed, shows himself rightly concerned to warn his readers against such chemical discussions of the subject as appear to

him crude. He will, I know, not mind my quoting some of his words. At one point, irritated perhaps by something recently read, he speaks out sharply. Having discussed some obscure aspects of cell structure he adds "but the position is dark, and placidly to regard the cell as though its mysteries were all but revealed by the magic wand of chemistry, is a sorry tribute to biological facts." And again, "A biological problem disguised by the sparkling terminology of the chemist is too often a pathetic and rather disreputable object." I would fain believe that the chemist—the would-be biochemist at any rate—has modesty enough to disclaim alike the possession of a magic wand, and the ability to speak a language which sparkles, but I quote these words of our distinguished colleague, realising that he is really much more merciful than they suggest, because they give me an excuse for suggesting that there are problems, essentially I think biological, which are disguised by any language which is not chemical.

I do not think in illustration of what I mean I need do more than repeat myself. With all the events that can be directly observed in living cells, including those truly remarkable occurrences involved in cell growth and division, cell differentiation in development, and the like, which it has been the privilege of classical cytology and especially experimental cytology to reveal, there must be associated molecular events as varied and in some way as controlled as are the visible events themselves. An understanding of these latter presents a problem which, however difficult of approach, is a real problem, and, surely, a biological problem. Only a frank disbelief in any real correlation between the invisible and the visible can remove it from that category. Yet if it is to be discussed it must be in the language of chemistry. Let me just add that there is a view sometimes expressed which I think receives a measure of approval from Prof. Gray. It claims that in cytological phenomena the influence of Form may be more important than that of Composition. If one could think only of static composition this might well be admitted, but biological components are seldom static, and dynamic changes, if they are specific, must be undergone by specific materials. In any case it seems to me that the view fails in certain ultimate issues. It is suggested for instance that the form of a chromosome rather than its chemical composition accounts for its influence. But at such magnitudes Form, as ordinarily understood, merges into molecular structure. Form holds its own, but as molecular form, the shape of molecules, and of this we have knowledge much more objective than was the case a few years ago. As I earlier mentioned, some leading cytologists are even coming to the conclusion that a chromosome is a unit structure and a complex protein molecule. I am not qualified to judge how far such a concept is justified, but if it be so it supports my general theme.

I fully sympathise with the distaste of biologists for facile chemical explanations which are a priori, and based, as Prof. Gray says, on "hypothetical biology." To read their protests is indeed a desirable discipline for the mind of the chemist. I think however that if chemists have sometimes so offended they—professed biochemists at any rate—are much less likely to do so to-day. They are at any rate, be it noted, concerned to offer descriptions rather than explanations.

Prof. Herbert Dingle in his noteworthy book "Through Science to Philosophy," referring to a certain conclusion of his own, remarks "In short, on looking forward with hope to a time when physics and biology will be safely wedded, it suggests that physics should be the proposer who, on bended knee, begs for acceptance, but it does not presume to suggest what name the happy couple should take." Under the head of physics he was doubtless thinking of physical science in general. I should like to find among my audience agreement with my own belief that biochemistry is to-day mature enough to justify such a humble proposal for matrimony, and trust you will share my hope that biology, in so far as it has been coy, will not remain so.

A SCIENTIFIC BORDERLAND

It is an old saying, abundantly justified, that where sciences meet there growth occurs. It is true moreover to say that in scientific borderlands not only are facts gathered that are often new in kind, but it is in these regions that wholly new concepts arise. It is my own faith that just as the older biology from its faithful studies of external forms provided a new concept in the doctrine of evolution, so the new biology is yet fated to furnish entirely new fundamental concepts for science, at which physics and chemistry when concerned with the non-living alone could never arrive. Whether they will prove to be such as to create an intellectual revolution comparable with that due to the development of atomic physics, who shall say? I sincerely believe that such new concepts are there to be revealed, but only perhaps as the result of new intellectual interactions. I speak, as you realise, with a special brief, but I think it is worth your while to consider whether a new line of advance in biology (not of course to the exclusion of many other lines) may not come from researches motived by a full conviction that each observed event in the complex behaviour of a living system is associated with equally complex and, surely, equally biological events at the molecular level of its constitution; and by the further conviction that both its aspects are worthy of equal intellectual concern. We must specialise in our methods, but we should share our interests.

You may ask whether I have in mind any policy which would encourage the intellectual approaches I have been advocating. It may be that they would be helped in the future by some modifications in present educational policy, but I will not enlarge on such a matter here. The main thing to hope for is the establishment of favourable mental attitudes.

In concluding my remarks I would like to take this exceptional opportunity for expressing a hope sincerely felt. As one shortly to leave the field of biochemical endeavour, I hope that my younger friends and colleagues will always justify their special designation and strive so far as is humanly possible to be biologists as well as chemists. As an ideal this is not easy of attainment, as I know well; but every effort towards it will increase the interest and the value of the work before them.

ST. GEORGE'S HOSPITAL.—Last year Mr. Harry Oakes, president of the Lake Shore Gold Mine in Ontario, gave £20,000 to this hospital and promised a further donation. He has now sent £60,000 to the hospital as the balance of his gift. Dame Marie Tempest has also sent £1000 to the fund for the ward at the hospital which is named after her. The money was collected at the Haymarket Theatre where she has been playing.

THE CLINICAL FEATURES OF CENTRAL PAIN*

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The Pathogenesis of Central Pain †

WHAT is commonly called pain contains, as Head has insisted, two elements, (1) a true, specific sensation equivalent to touch, heat, and cold, and (2) discomfort or unpleasant feeling-tone, which may accompany many other sensations besides those which have a right to be called specifically painful. Almost any stimulus of great intensity can produce discomfort. Thus, itching is disagreeable but not painful and slowly increased local pressure is uncomfortable before it evokes pain. I have already quoted examples of preservation of discomfort with abolition of pain in spinal lesions, and these indicate that impulses which excite feeling-tone are not confined to the pathways for pain. According to Head and Thompson [32] the impulses underlying a specific sensation are already endowed with the basis of feeling-tone on entering the second sensory neurone. When discomfort is associated with pain, heat, or cold, impulses travel with those for the specific sensation in the spinothalamic tract; but when it is linked with touch or pressure the posterior column or the anterior sensory tract is the conducting path for the combined physiological change. So also with lesions of the lemniscus in the upper part of the mid-brain, as well as with lesions of the thalamus, discomfort may to some extent be preserved in spite of abolition of sensibility to pain and temperature.

Discomfort, however, is particularly linked with pain especially with grosser painful sensations, such as are evoked by massive stimulation. The pain from deep pressure, burning, or intense cold is heavily loaded with feeling-tone and the same is true of painful visceral sensations. On the other hand the pain of a prick or cut, which is more localised and bearable, and with which intensity is to some extent graded, appears to be endowed with less feeling-tone. It is the prototype of pain as a specific sensation, whilst the pain of deep pressure, muscular cramp, and visceral disease is more allied to severe discomfort.

THE CHARACTERISTIC FEATURES OF CENTRAL PAIN

As I have already said a wide variety of pains and disagreeable sensations are met with. In studying them, one is at once struck by certain features which are common to most of them at whatever level of the neuraxis the causative lesion may be. This statement requires qualification in that pains which result from electrical stimulation of the cortex and from epileptic discharge are short in duration, less severe, and less devastating than are pains from lesions at lower levels.

It is usual to differentiate between "spontaneous" and "evoked" pain, but the distinction is artificial since all sensations are the result of stimulation. Pains may be said to be "spontaneous" only in so far as the stimuli which excite them are not obvious. They are less common than pains evoked by objective stimulation because for their development the abnormal physiological and psychological factors, which are necessary for the occurrence of pathological pain, must be more favourable; the threshold requires to be lower. Excitation of peripheral receptors, somatic and visceral, is probably present in all cases, and is the main physical basis of spontaneous pain, especially when it is persistent. Many of the sources of peripheral stimulation are conjectural, but, in addition to surface contacts and varying muscular tensions, changes in visceral and vascular activities, which normally do not disturb consciousness, may well be effective in favourable abnormal circumstances. With acute and incomplete damage of sensory tracts and grey matter, it is reasonable to assume, on experimental evidence, that local excitation at the site of the lesion may be a real force and may remain so until the diseased tissues have again become stable. The evolution of the painful phenomena in concussion and minor injuries of the cervical spinal cord,[34 43] and many cases of trigeminal pain from posterior, inferior cerebellar thrombosis, especially appear to support this view. In addition, the emotional state of the individual, in so far as it affects his receptivity to pain, is obviously of prime importance.

In the majority of cases of central pain from lesions below the cortical level, spontaneous pain is constant and persistent but subject to exacerbations which may occur for no apparent reason and can be evoked by many forms of stimulation. The form and intensity of effective stimuli are influenced, as would be expected, by the presence or absence of sensory loss. In the rare cases in which there is no evident sensory impairment, even light touch, and especially gentle moving contact, is effective, whereas if tactile sensibility is diminished, more definite pressure is required. In general, painful and thermal stimuli are most potent, but often forms of stimulation, which normally do not appear to possess affective qualities, evoke pain. Light touch has just been mentioned, but active or passive movement or vibrations may sometimes cause severe pain. Further, emotional disturbances and strong excitation of special sense organs, which used to be considered to be adequate only in the thalamic syndrome, may also excite pain, although less commonly in pain syndromes from lesions at suprathalamic, brain-stem, and spinal levels; and visceral activities, such as micturition and defæcation, may also lead to exacerbations of pain. In addition, it is occasionally found in thalamic cases that stimuli, which when applied to the normal half of the body are there neutral or even pleasant, at the same time provoke pain in the affected side (synæsthesalgia), a phenomenon which Foerster [20] has used in his argument in favour of a functional relationship of each thalamus with the whole body.

In any case massive stimulation, whether in intensity or extensity, is most efficacious and, when sensory loss is severe, may alone be adequate. The combination of continuous "spontaneous" pain and analgesia in rare cases of the thalamic syndrome is difficult to explain but certainly cannot be dismissed as neurotic.

The painful sensations, however evoked, are always abnormal in that they develop explosively, are excessive, compelling, diffuse and, usually, complex and continue unduly after stimulation has ceased. These features are constant for those sensations which truly come under the painful category, but the quality of the pain varies greatly in different cases and often changes during the course of the complaint.

* The Lumleian lectures for 1938, delivered before the Royal College of Physicians of London on March 14th and 17th. The first lecture appeared in previous issues.

† Based on a paper by Riddoch and Critchley [30] read before the Réunion Neurologique Internationalle, Paris, in 1937.

They are associated with exaggerated protective reactions, both somatic and autonomic, and especially, but by no means exclusively, in the thalamic syndrome, with great anxiety. Central pains have this in common with pains from visceral disease, causalgia, and painful phantom limbs that they possess a high degree of affectivity and for that reason tend to disorganise the patient's personality.

Sometimes pain of thalamic, bulbar, or spinal origin does diminish and, if slight, may even disappear. Such favourable results are exceptional in chronic cases but may occur during the subsidence of an acute lesion. Unfortunately, up to the present, all clinicians are in agreement on the resistance of central pain to treatment. This therapeutic gloom has, however, been somewhat diminished by the result of Frazier, Lewy, and Rowe's [22] operations on a patient who suffered from severe thalamic pain.

AUTONOMIC NERVOUS SYSTEM AND CENTRAL PAIN

Signs suggesting autonomic dysfunction may be present in the regions of the body to which pain is referred, and some of them can be related to involvement of sympathetic neural structures. Whether such coincidental disorders influence the development, severity, or character of central pain has been much discussed, especially in the French literature. The whole subject bristles with difficulties and, in the present imperfect state of our knowledge, it is impossible to arrive at a definite conclusion upon the origin of many of the vasomotor and other abnormalities and still less on their bearing upon the pathogenesis of central pain.

In the first place, it is perhaps worth restating that immobility alone can result in changes, for example in the hand, which may closely resemble the paralytic effects of autonomic dysfunction. They include cyanosis, alteration in local temperature, slight œdema, and nutritional disorders. Carmichael and his associates [55 60] have shown that alterations in temperature, colour, and sweating can be attributed to defect of autonomic innervation only when abnormalities of vasoconstrictor, vasodilator, and sweating reflexes can be demonstrated. Up to the present, they have found evidence of disorders of these reflexes in cases of paralysis and sensory loss from lesions at spinal and brain-stem levels, but not of the cortex, subcortex, and thalamus.

In any case, the changes to which I have been referring, whether due to immobility or loss of autonomic innervation, appear to be passive and, as in syringomyelia, are commonly unassociated with pain. Further, when pain is present, they do not seem to be related either to the quality of the pain or to variations in its severity.

In other cases, however, vascular abnormalities appear clinically to be of a different order, and often to vary along with fluctuation in the amount and character of the pain. Of them, redness and sweating are the most frequent, although pallor sometimes occurs. These are the cases to which Lhermitte, Bijon, and Nemours,[44] Ajuriaguerra,[1] and others have referred and which Crouzon and Christophe,[7] Alajouanine, Thurel, and Brunelli [2] have compared with causalgia. Usually they are severe examples of the thalamic syndrome, vascular lesion of the descending trigeminal nucleus, or syringomyelia. The pain then tends especially to be aggravated by a rise in the temperature of the affected part, to be soothed, when there is redness, by the local application of cold water and to have a burning quality. Here, it seems reasonable to suspect that the severity and perhaps the burning quality of the pain, as well as the peculiar distress that accompanies it, are in part due to stimuli derived from the abnormal state of the arteries. But to go so far as to conclude that such vascular impulses are transmitted by sympathetic afferent fibres in the peri-arterial plexus is unjustifiable. The balance of evidence, at present available, is in favour of transmission of sensory impulses by sympathetic afferents only from viscera, and they join the posterior root system.

COMPARISON OF LESIONS OF GREY AND WHITE MATTER IN THE GENESIS OF CENTRAL PAIN

Mme. Nicolesco [45] has draw attention to the greater frequency and persistence of pain and disagreeable sensations when central lesions, from the thalamus downwards, involve sensory grey matter rather than sensory tracts. This view is supported by clinico-pathological evidence as a whole, but especially by the large group of cases in which pain is persistent and the causative lesions appear to have become stabilised.

With pontobulbar and spinal lesions, local and remote pain may be equally severe during the active phase of the lesion; but afterwards remote pain often tends to subside whilst local pain, due to affection of sensory nucleus or posterior horns, may remain unabated. Thus, in concussion of the cervical spinal cord, agonising pain may be referred to parts at and below the level of the lesion and hyperpathia, in severe form, may be evoked. But whilst the painful phenomena in the lower limbs and trunk, as a rule, begin to diminish in a few weeks and may disappear, those in the neck and upper limbs are more protracted and often occur in cases in which remote pains are slight or absent. So also with vascular lesions of the brain-stem, for example posterior, inferior cerebellar thrombosis, in the acute stage, crossed hemialgias are not uncommon. But facial pain, due to affection of the descending trigeminal root and its nucleus, is usually more persistent than is the pain in the opposite limbs and trunk, which follows involvement of the spinothalamic tract.

The more common occurrence of spontaneous pain and over-response from affections of sensory grey matter than of conducting paths is even more striking with chronic conditions, such as syringomyelia, and spinal and brain-stem tumours. Further, the relatively greater importance of disturbance of the nucleus itself is shown by lesions of the optic thalamus with which central pain is most frequently observed and in its most striking, persistent, and intractable form. This emphasis on disordered function of grey matter must be significant.

PHYSIOLOGICAL DISTURBANCES UNDERLYING CENTRAL PAIN

It is accepted that inhibition is the essential physiological process by which pain is controlled. Amongst sensations, pain and discomfort are unique in that they lead to protective reactions which tend to be urgent and compelling and to permit of little choice. So ingrained are these fundamental motor accompaniments, that they are preserved when sensibility is abolished, and even when the spinal cord is transected. In the intact individual, however, the sensory and motor responses to harmful stimulation are kept under control in the interests of discriminative behaviour. Consequently the threshold for pain is high in comparison with that for the discriminative and adaptive forms of sensation. But, at the same time, "the mechanism underlying

the production of pain and discomfort must remain in full physiological activity, so that it can play its part in defence of the organism, whenever noxious stimuli reach a high grade of intensity." [30]

Under normal conditions, one method by which pain is kept in abeyance appears to be through the activity of the neural mechanisms concerned with those aspects of sensation which are called discriminative and it is adequate so long as pain receptors are not massively stimulated. It is well illustrated by the interaction of effects from stimulation of peripheral receptors as in Rivers and Head's experiment [51] on the glans penis. Pain which was evoked by water at 40° C. largely disappeared, and was replaced by a vivid sensation of cold when the temperature of the water was raised to 45° C.; but, as soon as the water at this temperature was brought in contact with heat spots in the corona, cold in turn gave way to a pleasant sensation of heat. When, however, the temperature of the water was brought up to 50° C. pain reappeared, the increased harmful qualities of the stimulus being now sufficient to break through the inhibition previously imposed by simultaneous stimulation of cold and heat spots.

Judged by the work of Sherrington and his collaborators, sensory inhibition is central and not peripheral, and is primarily a function of the synaptic junctions in the posterior horns of the segments which correspond to the part stimulated. Here also inhibition of impulses arising from visceral activity is imposed; and visceral pain is experienced, and the corresponding motor reactions are evoked, only when stimulation is massive enough to break through the inhibitory mechanism. In addition, control of irradiation or spread of pain is probably also primarily segmental. Cutaneous pain is more localised than pain from subcutaneous or visceral excitation because the skin is well endowed, and the deep tissues are not, with receptors for localisation which are, as a rule, stimulated simultaneously with pain end-organs when the skin is pricked or cut.

Head and Thompson,[32] long ago, insisted that the posterior horns, and their homologues in the brain-stem, are much more than simple relay stations for the passage of sensory impulses into the secondary sensory neurones. They possess integrative functions of prime importance. For, not only are sensory impulses, which underlie the same sensory quality, here grouped together irrespective of their cutaneous or deep origin, but the various streams of impulses, arriving at this junction from all receptors under stimulation, interact on one another, some being facilitated and others inhibited, partly or completely. Both excitation and inhibition are active processes, and are corresponding opposites in the Jacksonian sense. But they function in intimate partnership; in fact, except under artificial experimental conditions, the one cannot operate without the other.

Further, according to Head, it is likely that in their passage upwards to the thalamus and cortex, sensory impulses are re-subjected at each synaptic junction to the same effects of inhibition and facilitation, as additional streams of impulses from other parts come into play; and it is possible, as Creed [8] has suggested, that the transverse communications between afferent tracts may also have some functional importance in this connexion. Thus, even before they reach the optic thalamus and cerebral cortex to disturb consciousness, all sensory impulses undergo repeated modification, through the processes of integration. Under normal circumstances the points are set, from the posterior horns upwards, in favour of all those impulses which arouse discriminative sensations—touch, pressure, posture, &c.; and it is only when stimulation of pain receptors is massive enough to overcome the inhibitory processes, that pain impulses become prepotent. On the other hand, inhibition may be weakened by continued anxiety and general ill health and under these circumstances pain develops with abnormal ease.

Pain of central origin, that is from organic lesions of the sensory grey matter and tracts of the neuraxis, can be said to be the result of disintegration of the physiological processes which underlie sensory experience. The basic factor would appear to be reduction or loss of the inhibition to which potentially painful impulses are normally subjected. How is this achieved?

Following Head's theory [51] of the control of protopathic by epicritic sensibility, the first possibility is that central pain is released when the discriminative sensory elements are alone or disproportionally impaired. Foerster,[20] for example, has found that over-reaction to pain follows surgical division of the posterior columns. This effect, however, must be transient for it does not seem to be known with lesions of the posterior columns in ordinary clinical experience.

Attention has been drawn to the greater frequency of persistent pain and over-response in damage to grey matter as compared with sensory tracts; and with stationary lesions at any level, except perhaps the suprathalamic, spontaneous pain appears to develop more when the posterior horns, sensory nuclei of the brain-stem, or optic thalami are involved. It will be remembered, in this connexion, that a protopathic area from a peripheral nerve lesion, uncomplicated by causalgia or a tender end-bulb, is never spontaneously painful. From this evidence it is reasonable to assume that for long-continued spontaneous pain, and possibly also over-response to painful or uncomfortable stimuli, disturbance of function of the grey matter is necessary.

Symonds [58] has suggested, on the basis of Trotter's [59] theory of the cause of protopathic sensibility, that over-response to pain combined with a high threshold in central lesions is due to a certain limited impairment of conduction in pain fibres. Spiller [54] also adopted this view with regard to pains in syringomyelia and other diseases; and Holmes [34] considered that it might explain over-response in acute concussion and minor injuries of the cervical spinal cord. Whilst admitting that such a change in nerve-fibres may well be one of the causal factors of hyperpathia, I think that it is inadequate to explain spontaneous pain, hyperalgesia (over-response without sensory loss), and the greater frequency of central pain with lesions of the sensory grey substance. Thus, whilst upset of the integrative balance at synaptic junctions for the control of pain may result from interference with conduction in sensory paths, direct involvement of the synaptic mechanism by organic lesions seems to be of greater importance for the development of persistent spontaneous pain and over-reaction. One of the factors which may then determine the development of hyperpathia is a relatively greater blockage of impulses concerned with discriminative sensations and their associated inhibitory functions over pain impulses. In addition, under these abnormal conditions, pain receptors may be excited by stimuli, for example from peripheral circulatory changes, which are normally subliminal, but which now become effective and account for "spontaneous" pain. Faulty inhibition would also allow irradiation.

Lastly, disorganisation of the synaptic mechanism may be one of the factors which determine the appearance of complex painful sensations, such as burning pain.

The occurrence of persistent central pain in spite of complete cutaneous analgesia might appear to invalidate the theory of control of pain at synaptic junctions by impulses of discriminative value. Attention has been drawn to cases of this kind. Head has made it clear that at the spinal level discomfort may be preserved when there is complete loss to pain from either cutaneous or deep stimulation, and, at the level of the brain-stem, discomfort, associated with crude, compelling pain may be evoked when the patient is insensitive to the pain of a prick and the threshold for deep pressure pain is much raised. Impulses which excite discomfort do not therefore travel exclusively in the spinothalamic tracts and, further, it is likely from evidence supplied by chordotomy, as well as Foerster's results from direct stimulation of sensory tracts, that the contralateral spinothalamic path, although the main, is not the sole means of transmission of pain impulses. In addition, if massive stimulation is employed, these impulses may find a way open not only in the ipsilateral spinothalamic tract but perhaps also in the posterior columns and in short relayed tracts in the grey matter, as Foerster and others have suggested.

Still the possibility of transmission of impulses underlying crude pain and discomfort, in spite of the presence of severe analgesia, does not explain the exaggerated response they may evoke, sometimes as spontaneous pain but more often as hyperpathia. The difficulty, however, may be more apparent than real when it is considered that, for example in syringomyelia, the analgesia is largely the result of destruction of the crossing sensory paths for pain in the commissure whilst the uncontrolled response excited by the pain impulses which get through is a manifestation of the disorder of integration of the synaptic mechanism in the posterior horns of spinal segments involved. Local pain in syringomyelia probably occurs only when grey matter is involved, and, provided that a sufficient number of pain impulses can find a way through the affected region, is to some extent independent of the presence or absence of analgesia.

The question that has next to be considered is whether the control of pain impulses is reinforced by specially inhibitory descending paths. Head and Holmes [21] were the first to suggest the theory of thalamic control by the cerebral cortex through corticothalamic inhibitory fibres, which terminate in the dorsal part of the lateral nucleus. In some of their cases of thalamic syndrome, there was no measurable loss of cutaneous pain on the affected side and the threshold for pressure pain was sometimes even lowered. But some form of sensory loss was present in all. Since then a number of cases of persistent spontaneous thalamic pain and over-reaction, in spite of disappearance of all forms of sensory loss, which may have been present in the acute stage, have been described. Such cases strongly support Head's view and the causative lesion probably involves the terminations of the corticothalamic fibres alone. Interruption of the same inhibitory pathways is also the most reasonable explanation of central pain which sometimes results from suprathalamic subcortical lesions. As Souques [53] and others have pointed out, the clinical picture, in such cases, may be indistinguishable from that of the thalamic syndrome. The rarity of pain of suprathalamic origin may in part be explained on Head's assumption that the inhibitory fibres arise from all parts of the cortex, although recent anatomical evidence from mammals is in favour of their derivation mainly from the parietal lobe.

Foerster has extended Head's conception and considers that the caudate nucleus and putamen also exert control over the sensory functions of the thalamus, on the ground that he has discovered over-response to painful stimulation, but without spontaneous pain, following striatal lesions. It is difficult, however, to accept the view that a sensory mechanism can be controlled by a motor.

Foerster,[20] further, postulates corticofugal pain inhibitory tracts descending into the formatio reticularis and the spinal segments. He suggests that, in the mid-brain, they are situated in the tegmentum, and, in the spinal cord, in the posterolateral columns. According to him, interruption of these tracts, in the brain-stem, may be one cause of tegmental pain and hyperpathia, and, in the spinal cord may, in certain circumstances, be the sole cause of homolateral pain and hyperpathia or hyperalgesia.

Whether it is necessary to assume the existence of special subthalamic tracts of inhibitory function is open to question. If they exist their action would be one of reinforcement to the integrative synaptic mechanism in the sensory grey matter of the brain-stem and spinal cord.

Up to the present we have been mainly concerned with diminished inhibition as the chief factor underlying the disturbed integrative balance at different functional levels and so allowing pain to appear abnormally. The possibility of pathological stimulation of grey matter and sensory fibres at the level of the lesion, as a cause of pain, remains to be considered.

Prior to the publication by Head and Holmes of their paper on Sensory Disturbances from Cerebral Lesions, irritation had been generally accepted as the chief, if not the sole, cause of abnormal pain resulting from central lesions, whether progressive or stationary. This view they condemned and it has rightly become unpopular; for, accepting the teaching of Hughlings Jackson, it is believed that a stationary lesion cannot, except by release, produce positive effects. But are active lesions entirely in the same category? It is more than probable that, especially when acute, they can by local irritation, as well as by release, give rise to pain.

Pain is normally evoked by stimulation of its peripheral end-organs, but it has long been known that abnormal excitation of sensory nerves, plexus, or posterior roots, for example by pressure, electricity, or cutting, will cause painful sensations. In recent years, moreover, evidence has been accumulating to show that the paths for pain at various points in their central course are also sensitive to stimulation. Pain has been excited by electrical stimulation of the sensory cortex [21 47] and pricking or even touching the anterolateral and posterior spinal tracts.[20] The strychnine experiments of Dusser de Barenne on the cerebral cortex, optic thalamus, and posterior horns in animals also bear on this question. It may, of course, be argued, as Penfield has suggested, that pain associated with cortical discharge, electrical or epileptic, is the result not of direct stimulation of the appropriate cells or fibres but of release of pain mechanisms in the thalamus. To say that loss of inhibition does not always play a part is impossible; but to deny that stimulation, under these circum-

stances, is not acting as a direct exciting force is to be too one-sided. Probably both factors are in operation, but in varying degree. Pain and uncomfortable sensations developing during the active phase of acute or subacute lesions may well, in part, be the result of pathological stimulation. Either the sensory grey matter or the conducting tracts may be the seat of excitation, as in spinal concussion in which both are involved. It is impossible to say whether the cause of the lesion itself or chemical changes arising from it or local circulatory disturbances act as the stimulating agent. All, as well as other abnormalities, may be effective and the possibility of heightened excitability of the nervous elements by alteration in structure has to be taken into account.

In our preoccupation with the phenomena of central pain, and the consideration of possible explanations for its occurrence, we are apt to forget its comparative rarity, which is an equally arresting problem. It is most common with lesions of the optic thalamus but even here it is by no means invariable. Throughout the neuraxis, lesions which are comparable regionally and pathologically may give rise to similar clinical pictures, except that pain and over-response are present in some and not in others. Recent writers especially Ajuriaguerra [1] and Garçin [22] have been struck by this glaring anomaly. Many factors undoubtedly are concerned and most of them at present elude us. This, however, is clear that, as Garçin rightly says, morbid anatomy, valuable though it is, does not solve the problem. Nor is this surprising, for pain is a biological reaction of the individual as a whole, and for elucidation of its abnormal development, such factors as psychological and physical robustness to withstand pain and discomfort have to be taken into account equally with anatomical disorder of the structures which compose its mechanisms. Considered physiologically disorganisation at synaptic junctions is based on the one hand on diminished inhibition, whether due to reduced value of the discriminative sensory elements or of possible reinforcing inhibitory impulses, and on the other on massive stimulation of pain-responsive neural structures (peripheral or central). Considered psychologically, capacity to resist pain is partly inherited and is then an aspect of the constitution of the individual; and partly the outcome of education in self-discipline and adaptation to painful maladies. For example, the cyclothymic, who is born with a tendency to react emotionally, and the athlete, who has had little training in ill health, are apt to withstand pain less well than the individual who either is constitutionally gifted with more emotional control or has learned from experience to bear discomforts with fortitude.

Control or inhibition of pain and discomfort cannot be strictly labelled as psychological or physiological, for it must always act through physiological mechanisms. Excessive emotion is to perception and excessive affect is to sensation what excessive tone or spasticity is to motor activity. They all lead to maximal response at the expense of grading and adaptation.

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THE LANCET 100 YEARS AGO

May 26th, 1938, p. 309.

From a leading article on the desirability of an annual report on the health of the Navy.

. . . Publicity, like ventilation, purifies and gives vitality to Public Offices: in the dark, the walls throw out unhealthy damps, and lurid fungi, and acquire the fatal powers ascribed by Homer to the Circean poison, metamorphosing those who enter into all unclean animals, bats and reptiles—

Canis immundus, vel amica luto sus,

ravening wolves, and lions, all tamed, and fit only to assemble in anti-chambers, flattering the ascendant lord, like dogs, come from dinner, wagging their tails around their master. Publicity disenchants the walls; the light breaks the spell, and not only prevents office from exercising any deleterious effect on honest minds, but transmutes men already degenerated into useful public servants.

CHEMOTHERAPY OF PNEUMOCOCCAL AND OTHER INFECTIONS

WITH 2-(*p*-AMINOBENZENESULPHONAMIDO) PYRIDINE

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Experimental studies with sulphanilamide (*p*-aminobenzenesulphonamide) have shown that this compound is relatively inactive against the pneumococcus, as compared with its activity against hæmolytic streptococci. The original impression given by Domagk (1935) was that Prontosil (2 : 4′ diamino-4-sulphonamidoazobenzene) had some action on pneumococcus Type III but none on Types I and II; later (1936) he found that sulphanilamide was more effective against pneumococci than was prontosil. Nitti, Bovet, and Depierre (1937) found that, in vitro, sulphanilamide had an inhibitory effect on the pneumococcus, whilst Britton (1938) noted a definite but variable bacteriostatic and bactericidal effect on Type I, Type II, and Group IV pneumococci.

In the experimental field Buttle, Gray, and Stephenson (1936) stated that "against pneumococcal (Type I) infection the drug (sulphanilamide) has little effect"; later reports by Buttle and colleagues (1937) as well as by Buttle (1937) emphasise that sulphanilamide merely delays death in mice infected with pneumococci (Types I and II). Rosenthal (1937) reported that, in mice, sulphanilamide had some activity against seven strains of pneumococcus (Types I, II, and III) but indicated that there was considerable variation in susceptibility to different strains. Cooper, Gross, and Mellon (1937) found some effect against 10 lethal doses of a highly virulent Type III coccus inoculated subcutaneously into mice. Cooper and Gross (1937a) found also some protection against the intratracheal injection of Type III pneumococcus in rats, as well as against two strains of Type II (1937b) and of Type I (Gross and Cooper 1937). Schmidt (1937) found sulphanilamide effective against 10 lethal doses of Type XIV pneumococcus. Whitby (1937) found almost no protection with sulphanilamide against 10,000 lethal doses of Type I pneumococcus (intraperitoneal).

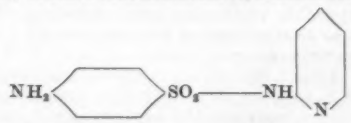
Clinical studies of pneumococcal infections in the human subject have been scanty. Most reports concern Type III infections, either of the lung (Heintzelman, Hadley, and Mellon 1937, Millett 1937) or of the meninges (Basman and Perley 1937); the last-named authors also describe a case of Type V meningitis successfully treated with sulphanilamide.

The advent of sulphanilamide gave an immense stimulus to research for chemical substances active against bacteria. The value of a large number of allied compounds has been assessed. Surveys of these have included the pneumococcus, and from time to time one or two substances have been found which have distinctly more activity against this coccus than sulphanilamide; most of such have had the disadvantage of being relatively toxic. Thus Buttle (1937) reported that the benzylidene Schiff's base of diaminodiphenylsulphone was more effective than sulphanilamide in prolonging the life of mice infected with Type I pneumococci, and half the mice infected with one lethal dose of culture survived for 30 days; the compound, however, was four times as toxic as sulphanilamide. Whitby (1937) found two diaminobenzenesulphonanilide compounds about three times more efficient than sulphanilamide for Type I infections in mice (10,000 lethal doses).

The following report deals with the activity, particularly against pneumococci, of the substance 2-(*p*-aminobenzenesulphonamido) pyridine. This is one of the many synthetic compounds kindly supplied to me by the research staff of Messrs. May and Baker; for the sake of brevity in this report, the substance will be referred to by its serial number—namely, M. & B. 693. The substance appears to protect the mouse effectively against 10,000 lethal doses of pneumococcus Type I and to afford considerable protection against 10,000 lethal doses of other types of pneumococci; it is as effective, dose for dose, as sulphanilamide against hæmolytic streptococci, and, experimentally, appears to be equally active against meningococcus; it has the great advantages of being relatively non-toxic and of being active in relatively small dose.

2-(*p*-AMINOBENZENESULPHONAMIDO) PYRIDINE

Nature.—The compound (M. & B. 693) is a white crystalline almost tasteless solid soluble in water at ordinary temperatures to the extent of approximately 1 in 1000; it has a constitutional formula as follows:—



From the formula it will be seen that the compound differs from sulphanilamide in that one hydrogen of the SO_2NH_2 group is replaced by a basic pyridine group. The substance is also related to *p*-aminobenzenesulphonanilide, which has been reported as being active against hæmolytic streptococci (Buttle, Gray, and Stephenson 1936). An account of the synthesis of this and of a number of other compounds is in course of preparation, and will be published later.

Toxicity and effective dose.—The average lethal dose has been determined using Gaddum's (1933) method of calculating the L.D. 50. For mice the average lethal dose is 16·6 mg. per gramme; for rats

TABLE I—TYPICAL PROTOCOL

Effect of 693 on Pneumococcus Type I

Dose of drug (mg.).	Inoculum (No. of organisms).	No. of mice dying on a given day after inoculation.							Survived.	Average survival-time (days) (max. 7).
		1	2	3	4	5	6	7		
Nil.	50,000	0	6	—	—	—	—	—	0	1·0
	500	0	6	—	—	—	—	—	0	1·0
	5	0	2	3	0	0	0	0	1	2·5
5	50,000	0	1	0	2	2	0	0	1	3·7
10		0	0	0	1	1	1	1	2	5·3
20		0	0	0	0	0	1	0	5	6·7
30		0	0	0	0	0	0	0	6	7·0

15·8 mg. per gramme (Wien 1938). Doses of 1 gramme administered daily, for seven days, to cats and dogs appear to have no effect on the blood, urine, and general health. Rimington and Hemmings (1938) have shown that sulphanilamide causes an increased excretion of porphyrins in the urine and fæces of human subjects under treatment, as well as in healthy rats. M. & B. 693 administered to rats in doses of 3 mg. per g., for a period of fifteen days, causes no increase in porphyrins in the urine (Wien 1938). For experimental infections in mice the effective dose of M. & B. 693 varies from 0·25 mg. per g. to 2 mg. per g., and is therefore from 66 to 8 times smaller than the average lethal dose.

Experimental assessment. — In all experiments described below the drugs have been given as a suspension in equal parts of water and mucilage tragacanth administered by stomach-tube. The mice used weighed approximately 20 g. The drug has been given on six occasions for each experiment: at the time of inoculation, 7 hours afterwards, and then once daily on the first, second, third, and fourth days. The amount of drug given *at each administration* is stated in the protocols; the total amount during the seven days of observation is therefore 6 times the amount stated. The number of mice in each experiment was 6. The inoculum for the test was a six-hour-old culture of the organism in O'Meara's broth, from which dilutions were made in ordinary broth so that the required inoculum was contained in 0·3 c.cm. Dilution to 10^{-9} contains approximately 5 organisms, a fact which has been controlled with each experiment by a viable count. Inoculations were made into the peritoneal cavity.

Observations were made over a period of one week and for a longer time when the question of immunity was being decided. The last column in the protocols, the average survival-time, is calculated by totalling the number of days survived by the 6 mice, and then dividing by 6, in the manner previously described by Whitby (1937). Table I shows a typical protocol, while Table II gives a summary of all the experiments, including parallel titrations with sulphanilamide.

TABLE II—SUMMARY OF ALL EXPERIMENTS
Including Parallel Titrations with Sulphanilamide
(*Pneumococcus Type I*)

Dose of drug (mg.).	Inoculum (No. of organisms).	No. of mice.	Average survival-time (days) (max. 7).
Nil.	50,000	60	0·7
	500	60	0·9
	5	60	3·3
693— 2	50,000	6	1·5
5		30	3·2
10		42	4·6
20		60	6·5
30		48	7·0
40		24	7·0
Sulphanilamide— 2	50,000	6	1·0
5		12	1·0
10		12	1·9
20		12	3·3

For the purposes of brevity other experimental results with M. & B. 693 and various types of pneumococci are summarised in Table III below.

Comments.—For comparative purposes the figures in Tables II and III, which provide some guide to efficiency, are the average survival-times: with a seven-day period of observation a figure of 7 indicates complete protection under the conditions of the experiment. It will be seen that M. & B. 693, in six doses of 30–40 mg., gives complete protection to mice inoculated with 10,000 lethal doses of Type I pneumococcus, and that in doses of 20–40 mg. there is complete protection against Types VII and VIII. Protection against Types II, III, and V is not complete, but is nevertheless high. Sulphanilamide used in doses up to 20 mg. (the maximum well-tolerated dose in 20 g. mice) shows a comparative efficiency figure of 3·3 for Type I pneumococcus; this represents delay in death, rather than protection.

With regard to Type III pneumococcus, parallel titrations with sulphanilamide in doses of 10 and 20 mg. gave average survival figures of 1·3 and 2·7 only.

It may be added that with Type I pneumococcus,

TABLE III—EFFECT OF 693 ON VARIOUS TYPES OF PNEUMOCOCCUS

Test organism: pneumococcus.	Lethal dose control. No drug.				Receiving dose of drug as indicated, and 50,000 organisms.		
	No. of mice with each dose.	Average survival-time with—			Dose (mg.).	No. of mice.	Average survival-time (days) (max. 7).
		50,000	500	5			
Type II.	18	0·6	0·8	2·4	10	12	4·0
					20	24	4·8
					30	12	4·5
					40	12	5·75
Type III.	30	0·4	0·5	2·4	5	18	2·1
					10	24	2·9
					20	36	3·5
					30	18	4·3
					40	18	4·7
Type V.	18	0·7	0·9	1·2	10	18	5·5
					20	18	6·5
					40	6	6·8
Type VII.	18	1·4	1·7	5·5	10	18	6·5
					20	18	7·0
					40	6	7·0
Type VIII.	12	0·6	1·2	3·4	10	12	4·25
					20	12	6·0
					40	6	7·0

which has been most extensively studied, observations, without further treatment, have been continued for fourteen days on 42 mice, and no late deaths have occurred. Furthermore 30 mice were reinoculated, at the end of the first week, with another 10,000 lethal doses of cocci. These animals were given no further treatment with the drug, and were found to be immune to this heavy secondary inoculation; indeed a few mice were found to be resistant to even 1,000,000 lethal doses. This immunity to pneumococcus in surviving mice has been previously observed by Buttle (1937). During the course of the experiments samples of blood and of peritoneal fluid from treated infected mice have been examined. With the experimental technique described it has been found that pneumococci multiply in the peritoneal cavity for at least four hours, but that soon after this time the organisms showed degenerative capsular changes. The capsules became swollen and crenated and eventually disappeared. Organisms were plentiful in the blood stream for periods up to 7 hours but, in 24 hours, in mice that recovered, the blood stream was almost clear.

TABLE IV—STREPTOCOCCUS HÆMOLYTICUS (RICHARDS)

Dose of drug (mg.).	Inoculum (No. of organisms).	No. of mice.	Average survival-time (days) (max. 7).
Nil.	50,000	42	0·4
	500	42	0·5
	5	42	1·7
693— 0·5	50,000	12	3·1
1·0		12	6·3
2·0		36	6·8
5·0		36	6·8
10·0		36	7·0
20·0		18	7·0
30·0		6	7·0
Sulphanilamide— 0·5	50,000	12	2·2
1·0		12	4·7
2·0		30	4·9
5·0		30	6·4
10·0		30	6·9
20·0		12	5·6

Effect on hæmolytic streptococcus.—The technique used has been the same as that described for pneumo-

coccus. The summary of the results including parallel titrations with sulphanilamide are shown in Table IV. The results show quite clearly that M. & B. 693 is highly active in a dose as low as 1 mg. per 20 g. mouse, against 10,000 lethal doses of hæmolytic streptococci. Dose for dose, the drug appears more efficient than sulphanilamide, and, in low dose, it is very definitely superior. In this series of experiments some 30 mice have been observed for fourteen days; no delayed deaths have occurred. Surviving mice showed no immunity to a second inoculation with 10,000 lethal doses such as was found in the case of pneumococcus.

DISCUSSION

It is evident that 2-(*p*-aminobenzenesulphonamido) pyridine possesses great chemotherapeutic activity against pneumococci of several types, more especially Types I, VII, and VIII, and also gives considerable protection against Types II, III, and V.

The variation in different strains of pneumococci as found by Rosenthal (1937) is apparent also from this report. Whereas most observers have found it easier to protect against Type III than Type I, the reverse has been the case in the present series of experiments. The substance is not only highly protective against the Richards strain of hæmolytic streptococcus in mice, but is also very efficient in doses as low as 1–2 mg. per g.

No protocols concerning meningococci are included in this report, but it may be definitely stated that the substance is active against this organism. The substance appears, therefore, to have a more polyvalent action than sulphanilamide, to be effective in low dosage, and to have the great advantage, as far as can be forecast by animal experiment, of being of low toxicity; there is evidence that it does not produce porphyrinuria.

These experiments represent the one striking success in the chemotherapy of pneumococcal infections in an assessment of no less than 64 related sulphanilamide compounds, some soluble, others insoluble. It is proposed to extend the work on the particular compound here reported, and to investigate other substances similarly constituted.

SUMMARY

1. 2-(*p*-aminobenzenesulphonamido) pyridine is chemotherapeutically active in experimental infections in mice against pneumococci of Types I, II, III, V, VII, VIII and especially against Types I, VII, and VIII.

2. It apears to exert a definite action on the capsule of the pneumococcus.

3. It is as active as sulphanilamide against hæmolytic streptococcus and meningococcus.

4. It has a low toxicity for animals and does not produce porphyrinuria in those tested.

I am greatly indebted to Mr. A. J. Ewins, D.Sc., of Messrs. May & Baker Limited, for the production and preparation of the many compounds that have been assessed; to Messrs. May & Baker Limited for defraying the expenses of this work; and to my senior technician, S. R. M. Bushby, for his loyal coöperation.

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(*Continued at foot of next column*)

TREATMENT OF ACUTE SUPPURATIVE OTITIS MEDIA

A SIMPLIFIED METHOD SUITABLE FOR UNSKILLED HANDS

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It is generally conceded that simple mastoidectomy should be seriously considered wherever an acute suppurative otitis media has persisted for three weeks or more. Like so many other propositions in clinical medicine, this statement must be qualified before it can be applied with any rigour. To begin with we should really say "has persisted—without definite improvement—for three weeks or more." Again we should add "and provided there is no coexisting condition, such as pneumonia or gastro-enteritis, which is adversely affecting the general body resistance." A third qualification of supreme importance is "and provided that the case has been adequately treated." This last seems so obvious as not to need mentioning, yet I have no hesitation in saying that it is a condition which is not complied with in the great majority of cases.

The treatment of acute otorrhœa in the first few weeks is almost entirely in the hands of general practitioners or public health clinics. The purpose of this article is not to disparage the work either of the practitioner or of the minor-ailment clinic, but to demonstrate how the difficulties of treatment and futility of standard instruments and techniques make such work ineffective to the last degree.

The proof of this can be seen at any time in any clinic which makes a practice of subjecting these cases to expert treatment. It is a common-place experience to see ears which have been discharging for months dry up within a few days. I do not refer here to the so-called chronic ear which may have been discharging for years, but to the case which begins with acute otitis media and drags its wearisome course for unnecessary weeks and even months. Many of these cases finally degenerate into "chronic otitis media," but even in those which eventually heal, the prolonged suppuration is only too likely to have caused serious damage. Permanent perforation of the drumhead, erosion of ossicles, and fibrosis of tympanic mucosa will predispose to further acute attacks and to progressive deafness in later life. Lastly, one cannot but suspect that mastoid operations are being performed unnecessarily on the strength of persistent suppuration when all that is required is adequate conservative treatment.

HOME CLEANSING OF THE DISCHARGING EAR

It will naturally be asked why I claim that adequate treatment is so rarely available. The

(*Continued from previous column*)

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answer is that in most cases the treatment is not even in the hands of the practitioner or clinic nurse—it is in the hands of the mother. We may lay down our proof in a few words.

1. Adequate treatment implies efficient cleansing, drying, and applications of medicaments.

2. Owing to the anatomy of the ear, this is quite beyond the power of any mother. Indeed few nurses can do it, unless specially trained, whilst general practitioners rarely have the time or opportunity.

This proof will be more convincing after we have discussed in detail the standard methods of treatment.

In the earliest stages of the otorrhœa there is a profuse discharge which is highly infectious and liable to set up a septic dermatitis of the pinna. Soon the skin of the external auditory canal and the drum become intensely inflamed, and there is always a possibility of the discharge becoming dammed back in the middle ear and attic. Clearly the aims of treatment are:—

1. To remove discharge as quickly as possible.

2. To soothe and protect the skin of the pinna and canal.

3. To diminish the congestion of the drum so that discharge cannot be dammed back by intermittent blockage of the perforation (or myringotomy incision).

There is no doubt, too, that many cases of acute otorrhœa become subacute and finally chronic, because

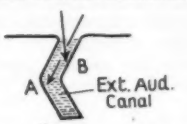

FIG. 1

FIG. 2

of the formation of exuberant granulation tissue around the perforation. Thus is formed one type of acute aural polyp which is comparable to the exuberant granulation tissue seen occasionally in ordinary incisions and which so obstinately checks epithelialisation.

How may the ear be cleaned? (1) By dry mopping; (2) by syringing; and (3) by hydrogen peroxide.

I have put the methods in order of preference. This is no place to discuss the demerits of hydrogen peroxide. I am in complete agreement with most otologists in condemning it. The choice between syringing and dry mopping again raises the controversy between wet and dry methods. There can be no doubt that *in expert hands* the dry method is much to be preferred. On the other hand, if the patient is to be left in the fumbling care of an overanxious mother, the wet method is more suitable. The purpose of this article is to show how, by means of a quite simple instrumentarium, it is possible for the most inexpert to overcome the difficulties of the dry method. It is comparatively simple to squirt an ounce or more of saline into an ear from a soft ball syringe and even to do it aseptically. But to dry out an ear aseptically with pledgets of sterile wool is a job for an expert.

The external auditory canal is not straight, it is kinked in both horizontal and vertical planes. In Figs. 1 and 2 we see how an ear full of pus will only be half emptied by the usual method of drying it with "a little wool wound on a match stick," and in the process trauma is only too liable to occur at A or B.

The next step in the dry method is to fill the ear with powder. The expert has a powder-blower. Not so the mother. She usually ends by twisting a cone of paper and sifting in as much as she can, as in Fig. 3. The result is inevitable and pathetic in its futility: a well of pus deep in, an air-space, and finally an outside crust of powder. Nor would it be feasible to supply powder-blowers to parents. To begin with, the usual model is too expensive. In addition, apart from minor inconveniences, it has two major faults: first, it is very liable to clog up; and secondly, it can only blow in a small amount of powder, after which it blows out as much as it blows in.

Despite the manifest futility of the dry method in these circumstances, it is being taken up enthusiastically on all sides. Either finely powdered boric acid or else magnesium sulphate is prescribed. Of course, the method is by no means new. It has undergone periodic resuscitations during the past thirty years, and has relapsed into undeserved oblivion each time, for the obvious reason that the satisfactory results obtained by the expert cannot be repeated by the amateur.

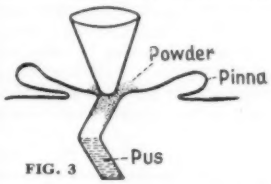

FIG. 3

Because of this the wet method of syringing the ear with a small ball syringe is still widely used. This undoubtedly clears out the pus fairly efficiently, but it keeps the ear constantly sodden. I believe that it predisposes to the formation of the abovementioned acute aural polyp, and also that the œdematous tissues of the drum are only too likely to block the perforation. A valuable modification of this wet method is to use alcohol instead of water. This undoubtedly is a great advance, for the epithelium loses its sodden nature and the perforation is kept open. Actually it is impossible to use full-strength alcohol as it causes agonising pain. As a compromise 60–70 per cent. alcohol has been suggested, but even this is not well tolerated. The addition of a local anæsthetic such as Novocain to the solution has also been proposed, but this is clearly futile: the pain is induced immediately, whilst the anæsthetic action will take ten minutes or more to develop. This method, therefore, is very unlikely to be approved by parents, although it is worthy of consideration for hospital use.

FIG. 4.—The wire wool-carrier (half natural length).

In all honesty, one must mention a farther "line of treatment" which is probably more widespread than any of the above. I refer to the method of "masterly inactivity." The doctor or otologist simply prescribes his favourite "ear drop" for repeated instillation into the affected ear, knowing full well that no possible benefit can accrue. Everyone feels that adequate treatment has been ordered, but in point of fact the magic bottle might just as well be emptied down the drain.

THE PROBLEM SOLVED

A solution of this problem is urgently required, and is in fact ridiculously simple. We need instruments which will be so simple, safe, and efficient that any mother can use them for the home application of the dry method.

We need, first, a wool carrier which will be safe and efficient even in the most amateur hands. Furthermore, it must be inexpensive. Fig. 4 shows such a carrier which I have been using for years now. It is simply a double strand of wire twisted tight,

with a loop at one end for convenience of holding. The free ends project slightly as at P, sufficiently to hold a fine twist of wool. The advantages of this instrument are obvious. Owing to its pliability it can be pushed right down to the drum without the slightest fear of causing any damage. A dozen at a time can be capped with wool, dropped into a test-tube, and sterilised. They can be entrusted to any parent who can learn in two minutes how to dry out an ear quite efficiently.

The actual winding of the wool naturally requires a little care so as to ensure that the sharp ends do not project. This, however, is a perfectly simple matter, and amateurs can be taught in a few minutes how to do it.

What now of a powder-blower which will be cheap and efficient and safe? Fig. 5 shows a piece of glass

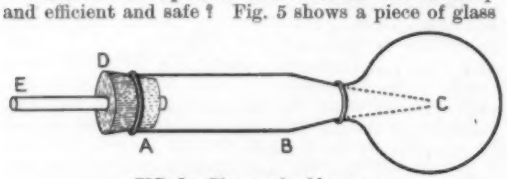

FIG. 5.—The powder-blower.

tubing AB drawn out at B so that it fits into a rubber bulb C. The end A is closed by a cork D, which is pierced by a tube E. The latter can be made of glass, but if the instrument is intended for clinic use it should be of metal, so that it can be sterilised after each case by holding it in a flame for a few seconds. This blower does not clog, and even the clumsiest mother should be able to use it efficiently.

I firmly believe that if these simple instruments could be available for the home or clinic treatment of acute otitis media, we should speedily see a most gratifying diminution in the incidence and severity of middle-ear disease.

SUMMARY

1. Widespread damage is caused by middle-ear suppuration.
2. Treatment is almost entirely in the hands of inefficient parents, or overworked clinic nurses.
3. Technical difficulties are considerable and standard instruments quite inadequate.
4. Two simple instruments are described which enable even untrained workers to give efficient home treatment.
5. It is hoped that this adequate treatment of middle-ear suppuration in the early stage will play an important part in the prevention of deafness.

These instruments can be obtained from Messrs. Servisol Ltd. (64, Myrtle-street, Liverpool, 7), to whom I am indebted for help in the final designs.

FEMORAL THROMBOSIS*

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THE only justification for the term "femoral thrombosis" must be that at present it is used to describe a well-recognised clinical condition of swelling and œdema of one or both limbs, coming on suddenly during the puerperium, in the post-operative period, or during some acute infection or other pathological process. After the acute onset the patient is left with a limb which in the majority of cases is painful and disabling, showing œdema after functional use, and which is liable to certain complications. At the same time a collateral venous circulation may develop in the superficial veins of the limb or in those of the trunk. The underlying pathological process has usually been regarded as a thrombosis of the femoral, external, or common iliac vein. Whether this thrombosis always occurs and, if it does, whether it is a primary or secondary one in the production of the clinical picture will be discussed, but for the time being the useful term "femoral thrombosis" will be used to describe a condition that appears to be a clinical entity.

The condition is often met with in medical, surgical, and obstetrical practice, yet no one, apart from the obstetrician, is likely to see any extensive series of cases. The term "white leg" is usually confined to femoral thrombosis occurring in the puerperium, but there is nothing in the clinical features of these as a group to distinguish them from the thromboses in the other pathological conditions, and there is really no reason why the term "white leg" should not be used to cover all the different groups.

Of recent years the subject of thrombosis has received a considerable amount of attention in relation to the question of post-operative thrombosis and its bearing upon the development of pulmonary emboli. On the other hand, the ultimate clinical results of these deep thromboses have not often been studied in any large series of cases.

CLINICAL MATERIAL

The 85 cases here recorded occurred consecutively either at St. Bartholomew's Hospital or in private, and form part of a series of 1300 cases referred to me for treatment on account of diseases of the arterial, venous, or lymphatic system of the limbs.

For the purposes of this paper, cases have been regarded as coming justifiably within the category of femoral thrombosis if the following criteria were satisfied:—

(1) The presence of an established cause as, for example, the puerperal or post-operative state, or the presence of some acute infection.

(2) A history of the comparatively rapid onset of pain, swelling, and heaviness of one or both limbs, involving the limb at least to the level of the knee, in many cases including the thigh and occasionally involving the lower abdomen and the gluteal region.

(3) A protracted period in bed averaging about six weeks, but in the worst cases extending to many months or even a year.

The majority of the 85 cases were not seen during the acute phase of the thrombosis. Reliance has had to be placed upon the patient's history, and, provided the three criteria set out above were satisfied, they have been included as cases of femoral thrombosis.

NATURAL HISTORY

The present paper is concerned mainly with the remote effects of femoral thrombosis and few only of the cases recorded have been under observation during the stage of onset, but for the sake of completeness a description of this stage is necessary. The onset is usually acute, with pain, swelling, and œdema of the limb. The pain varies from a dull heavy ache or dead feeling to excruciating pain, and it may involve any part of the limb or perineum. At times the onset is so severe as to suggest an arterial occlusion. Swelling usually affects the whole limb to the groin but is always worst peripherally. At times the

* Part of an essay on Phlebitis awarded the Buckston Browne prize by the Harveian Society of London.

tension in the tissues is so great that there is no pitting on pressure. The pain and swelling take 24 to 48 hours to reach their maximum, after which they gradually begin to subside. There are extreme variations in the severity of the process, but the average case takes about six weeks for the œdema to disappear at rest, though of course it returns in the upright posture.

ÆTIOLOGY

Femoral thrombosis may occur during the course of a great variety of diseases and pathological states, particularly acute or chronic infections, in the post-operative period or in the puerperal state. In addition to these, it may be a late or terminal process in cachectic conditions. In the group of cases now under consideration, thrombosis, phlebitis, and lymphangitis may all play a part. Infection may be responsible for initiating the process, but the development of an infective thrombophlebitis with suppuration does not occur.

From the Table it will be seen that the largest group was a manifestation of the puerperium, the second largest was post-operative, and the third typhoid. One of the outstanding features is the preponderance of left-sided thromboses. In the unilateral cases the left side was affected approximately 2½ times as often as the right. This suggests that anatomical factors play some part in the process.

TABLE SHOWING CAUSES, SEX, AND SIDE INCIDENCE

Causes.	Total and per cent.	M.	F.	R.	L.	Both sides.
White leg	39 (45·9)	..	39	9	18	12
Post-operative ..	17 (20·0)	4	13	5	7	5
Typhoid	12 (14·1)	7	5	1	10	1
Pneumonia and broncho-pneumonia	6 (7·0)	4	2	1	5	..
Pleurisy	1 (1·2)	1	..	..	1	..
Influenza	2 (2·3)	..	2	..	1	1
Phlebitis	5 (5·9)	1	4	2	1	2
Fracture	1 (1·2)	1	..	..	1	..
Ulcerative colitis ..	1 (1·2)	..	1	..	1	..
Erysipelas	1 (1·2)	..	1	..	1	..
Totals	85	18	67	18	46	21

M. and F. = male and female; R. and L. = right and left.

RESULTS OF THROMBOSIS

With the immediate prognosis at the time of the acute onset of the thrombosis I am not here concerned, but it may be pointed out that deaths from pulmonary emboli are much less likely in "manifest" than in "occult" thrombosis. It may be that the outward and visible signs of femoral thrombosis mean the presence of something more than a lightly adherent thrombus in the vein.

The following were the main symptoms complained of by patients:—

Discomfort and pain: Numbness, aching, severe pain, heaviness either constantly or after exercise, cramps, tenderness, stiffness.

Swelling and œdema: Persistent swelling, swelling in the evenings or after exercise.

Development of varicosities: Varicose veins in the limb, varicose veins in the trunk.

Changes in the skin and subcutaneous tissues: Dermatitis, recurrent ulceration, recurrent phlebitis, periphlebitis, and scleroderma.

Typically, the patient is left with a functionally damaged limb which is a constant source of discomfort, disability, and anxiety. After a night's rest the limb is approximately normal but œdema develops with activity and is usually considerable by the early evening. In others some degree of œdema is always present; these patients have constantly to nurse the limb. Moderate activity is possible, but prolonged walking or standing is extremely painful and the majority have seriously to limit their activities. In the absence of complications, many show a gradual tendency towards recovery.

A second group includes cases with complications—varicose veins, phlebitis, dermatitis, ulceration, pigmentation, periostitis, &c. These patients are only too conscious of the ever-present burden of the damaged limb which is functionally of little value and causes inconvenience, discomfort, and pain. Once complications have occurred, persistence of symptoms is almost inevitable unless early and energetic measures are taken. Minor trauma is often fraught with far-reaching consequences and slight abrasions or infections are only too often the starting-points of prolonged ulceration.

PHYSICAL SIGNS

The cases may be analysed into four groups:—

(1) The physical signs suggested that the underlying pathological process was confined to some obstruction of a deep vein which mainly gave rise to a compensatory dilatation of superficial veins.

(2) Œdema was the characteristic feature but there was no evidence of any abdominal collateral circulation.

(3) A collateral abdominal circulation and the presence of œdema suggested obstruction to deep veins and obstruction to the lymphatic return of the limb.

(4) The physical signs indicated a complete return to normality of the limb, but no case of this type is recorded in the present series.

The 85 cases were divided into these groups as follows:—

Pure thrombosis	2
Pure lymphangitis	61
Thrombosis and lymphangitis	22
Complete recovery	0
Total	85

In considering the question of a collateral circulation, attention has been confined to abdominal vessels. Sometimes dilatation and varicosity of the saphenous tract develops subsequent to deep thrombosis but without evidence of any abdominal collateral circulation. These cases form a small group and have not been especially analysed owing to the fact that many patients had existing varicose veins at the time of the deep thrombosis, and others again were not quite certain of the chronological relationship between the deep thrombosis and the development of saphenous dilatation. On the other hand, the objective manifestations of abdominal varicosities are easily made out on physical examination.

In the first of the 2 cases of pure thrombosis typhoid was the cause, and the limb was half as large as its fellow with total dilatation of the saphenous vein but there was no œdema; in addition, there were three very large veins from the saphenous opening passing over the lower abdomen. In the second case, the thrombosis followed a miscarriage; there was no œdema, but from the region of the groin huge veins passed up to the level of the nipples. It is probable that the figure of 61 for the "pure lymphangitis" group over-estimates the number of cases of pure lymphatic obstruction for the reason

given above in connexion with the collateral circulation. The degree of œdema naturally varies from patient to patient. In the mildest the limb is entirely normal in the morning and it is only at the end of the day that slight œdema over the anterior border of the shin can be made out. In other cases the œdema develops after a few hours' exercise and becomes very severe during the afternoon. In a further group the limb is always considerably larger than its fellow and anything more than moderate function is impossible. In general, the disability is proportionate to the œdema. In the 22 cases with evidence both of thrombosis and of lymphatic obstruction there was an abdominal collateral circulation together with some degree or other of œdema of the limb. In no case in the series did the limb return completely to normal. Had such complete recovery occurred, then it would almost certainly have been met with in the 1300 cases from which the deep thrombotic ones were selected.

Collateral circulation.—The term "collateral circulation" has been used here only in relation to abdominal varicosities. That involving the saphenous vein has been excluded for the reasons already given.

In 22 of the 85 patients there was evidence of an abdominal collateral circulation. In 2 the condition was apparently one of pure thrombosis, and in the remaining 20 cases it was associated with some degree or other of lymphatic obstruction. The extent of the collateral circulation varied considerably in the different cases:—

Pubic or hypogastric	9
Lower abdominal	5
Pubic and lower abdominal	3
To nipples	3
Iliac crest	1
Perineum and lower abdominal	1
Total	22

The pubic or hypogastric group was the largest, the veins in these cases being dilatations of superficial external pudic vessels, which anastomose with corresponding vessels on the opposite side. At the same time, where varicosity is well marked, the anastomoses may lead to a secondary dilatation and varicosity of the internal saphenous vein on the opposite side. The lower abdominal group is next in importance and represents dilatation and varicosity of the superficial epigastric vein, while under "pubic and lower abdominal" is included cases that combine the two previous groups. In 3 cases there were extensive varicosities reaching to the level of the nipples and anastomosis was effected with intercostal veins. In some of these, vessels were also present passing up to the axilla.

There was no evidence in these 22 cases to suggest that the compensatory circulation in any way affected the degree and persistence of œdema of the limb. The abdominal collateral circulation caused embarrassment to a few patients. Some were conscious of a dull ache: one had quite severe discomfort associated with very large thin-walled veins protruding through the skin; in another the hypogastric circulation was the site of recurrent phlebitis; whilst in other cases the varicosity of the sound limb was the cause of symptoms.

Ulceration.—At some time or other in 26 of the 85 patients—30·6 per cent. or approximately one in every three—there was the added complication of subsequent ulceration. The main features of the ulceration occurring in deep thrombosis are well known. It occurs most often in the lower half of the leg on the inner side, and frequently follows some minute injury or abrasion. On account of the serious circulatory defects in the limb, chronicity is the rule. With time the tissues surrounding the ulcer become thickened, hard, and indurated, and the ulcers themselves are frequently deep, dirty, and indolent. Extensive inflammatory changes may take place in the adjacent subcutaneous tissues. In many cases this inflammatory reaction is so severe as to involve the periosteum of the leg bones, and the linear extent of this periostitis is often surprising. From the point of view of ætiology, these ulcers are best regarded as lymphatic and gravitational in origin, and from the point of view of therapy they form a much more intractable group as a whole than ordinary varicose ulcers. In 8 patients the ulceration had been present either continuously or in a recurrent form for over 15 years; in another for 36 years.

Phlebitis.—Attacks of phlebitis were present in 9 cases (10·6 per cent.) either as single attacks or in the form of recurrent attacks. The phlebitis involved superficial varicose veins and in no way differed from the phlebitis occurring in idiopathic varicosities, with the possible exception that in cases with considerable œdema periphlebitis was more likely to occur.

Post-operative group.—The deep thrombosis was a post-operative complication in 17 patients. The antecedent operations are as follows:—

Operation.	*Cases.*
Appendicectomy	6
Hysterectomy (one with appendicectomy)	3
Fibroids	1
Ovariotomy	2
Cholecystectomy	1
Gastro-enterostomy and appendicectomy	1
Inguinal hernia	1
Breast abscess	1
Varicose vein excision	1
Total	17

It will be seen that the two largest groups are those associated with appendicectomy and with operations on the female genital tract. The operation involved the peritoneal cavity in all but 2 cases.

TREATMENT

The treatment of femoral thrombosis may be considered in relation to the acute, the transition, and the remote periods.

Acute period.—Treatment must be largely governed by two considerations, the risk of pulmonary emboli and the painful and disabling nature of the condition. It has become conventional to keep these patients in bed for a period of at least six weeks, almost irrespective of the degree of severity of the lesion. As has already been pointed out, pulmonary emboli are much more likely with latent than with manifest thrombosis, and the risk of this complication will have passed by about the end of the second week. During this phase the patient must be in bed with the limb completely immobilised and encased in wool. At the onset the pain may be extremely severe and sometimes calls for morphia. After this initial period the limb should be elevated above the level of the rest of the body as this will do more than anything else to diminish the lymphatic œdema. The length of this initial period in bed must be determined by the severity of the œdema. In the slighter cases very little œdema may be present at the end of a month. In severe cases the limb may be grossly œdematous three months or more after the thrombosis. If œdema is present at rest it is quite certain that it will be aggravated by any attempt at activity.

Transition period.—Between the acute phase and the time when the limb obtains some degree of circulatory stability, treatment must be designed to prevent the development of anything like pronounced œdema. The more there is œdema as a result of overactivity of the limb, the more will the lymphatic spaces become dilated and, in consequence of this, the more readily will the limb tend to become œdematous. Treatment must consist in controlling

this tendency, by permitting exercise that stops short of producing œdema. Local control can be obtained by the various forms of external support, such as Elastoplast. If these supports are used, they should be applied when the limb is not œdematous. Without external support much greater modification of activity is necessary to avoid œdema. Superficial massage and sinusoidal surging current baths may be of value.

Remote period.—The circulatory condition of the limb becomes almost stabilised and adapted to the new conditions after the strains imposed upon it during the acute phase. Depending upon the severity of the initial condition, this period may be reached in anything from six to twelve months. By this time the patient should have passed out of the acute phase and should have become aware of the approximate functional capacity of the limb. Whatever therapeutic measures are employed, it is certain that the majority of these patients have to adapt themselves and their lives to the local circulatory failure of these damaged limbs. The nature of that adaptation will depend primarily upon the degree of residual œdema. It may mean that certain occupations that involve standing or walking are quite precluded; or it may mean a period of recumbency during the middle of the day, or only rest after the day's work. Control of the œdema will involve the continued use of elastic strapping in the most severe cases, and by this means patients who were formerly complete cripples may be enabled to walk. In the less severe cases œdema may be controlled by the use of surgical stockings. Many patients, however, are completely intolerant of any form of external support, and in these improvement both real and symptomatic may be obtained by the use of massage and sinusoidal baths for periods of about a month, two or three times a year. In this way, limbs which are painful and weak may be rendered much more useful through the diminution of pain and œdema and the improvement in muscular tone. Radiant heat should not be employed in the treatment of these patients. Limbs that have been the site of deep thrombosis appear to have a diminished sensibility to pain; they are apparently much more easily burned than are normal limbs, and the burns are very intractable.

Varicosities.—It was formerly my practice to consider the treatment of any secondary varicosity that developed in these limbs as being strongly contra-indicated on account of the fact that the superficial dilatation was compensatory. Sometimes, however, this becomes an over-compensation, and superficial veins that were taking on the work of obstructed deep veins may lose their efficiency as the result of secondary incompetence of the valves. The real problem in these limbs is not connected with the presence of varicosities, since it is the œdema that is invariably the main cause of symptoms. It is important therefore to decide how far varicosities are the cause of symptoms. If œdema is slight and varicosities are prominent, then treatment by means of operation or injections may diminish symptoms and render the limb more comfortable, but if œdema is marked, then the treatment of varicosities is not likely to effect any serious improvement in the functional capacity of the limb. At the same time, the use of injections under these circumstances may often provoke quite a sharp reaction in the veins, together with periphlebitis. If treatment is carried out it should only be after a full consideration of all the facts, and injections should be carried out at infrequent intervals. Only in a few instances do abdominal collateral veins cause symptoms or reach a size sufficient to demand treatment. When these veins cause serious local discomfort there is usually no danger in obliterating them therapeutically by operation or by injection. Similar measures may be necessary in cases where abdominal veins have reached a large size or have become exceptionally thin-walled. When the collateral circulation has secondarily involved the superficial veins of the sound limb, there is no serious objection to treatment of these veins if indicated.

Ulceration.—The main features of ulceration in deep thrombosis have been described. Treatment of this group of cases is not as satisfactory as that of ulceration secondary to idiopathic varicose veins. In the latter group the obliteration of the varicosities is followed by healing of the ulceration. In ulceration associated with deep thrombosis, the ulcerative process is secondary to lymphatic obstruction, an obstruction which is not amenable to treatment. Varicosities may also be present in these cases, but the cure of these is not so readily followed by the cure of the ulcers. At the same time the chronicity of these ulcers often leads to the development of periostitis of the adjacent bones, a change which in itself tends to persistence of ulceration. Skiagrams should be carried out in all cases to determine the extent of any bone involvement. Ulceration cannot be expected to clear up in limbs which are constantly œdematous. Whatever treatment is carried out, it must involve the rendering of the limb free from œdema. This result may be achieved by a long period of recumbency, or by persistence in the use of elastoplast, &c. Both of these methods may in time achieve healing of these very intractable ulcers. In cases where varicosities are present in close relation to the ulceration, treatment by means of operation or injection should be carried out in conjunction with the foregoing measures designed to diminish œdema.

INCIDENCE

How common is femoral thrombosis? From the available data it is almost impossible to get accurate statistics, but it is certain that the main incidence of the disease occurs in the puerperal and post-operative types.

In the puerperal type, the incidence of deep thrombosis is variously given as from 0·21 per cent. (Nettelblad 1931) to 0·91 per cent. (Seitz). Taking 0·5 per cent. as an average incidence and the number of births in England and Wales, 1936, as 605,292, this gives a total of 3026 cases for the year.

The incidence of femoral thrombosis in the post-operative group varies from 1·2 per cent. for abdominal operations (Clark 1903) to 2·19 per cent. for gynæcological operations (Schmidt 1931). There are no data available as to the total number of major operations performed in England and Wales in the course of a year. Assuming a very conservative number of 100,000 and taking the incidence of femoral thrombosis as 1·5 per cent., then this gives a total of 1500 cases per annum.

It is impossible to get any exact data for the other groups of cases. Taking all these sources together upon a very conservative basis, some 5000 cases of femoral thrombosis must occur annually.

ÆTIOLOGY

The results of the present investigation show that circulatory recovery is never complete after so-called deep femoral thrombosis. It has been suggested that this condition is associated in some cases with mere thrombosis, in others with a lymphatic obstruction, and in others again with a combination of thrombosis and lymphatic obstruction. In explanation of the pathology of femoral thrombosis, the following factors have to be considered:—

Venous.—It has generally been accepted that the deep veins are obstructed and that this is responsible for the sequelæ in these cases: but there is very considerable evidence on clinical and experimental grounds against the view that obstruction of a deep vein can ever be responsible for persisting œdema.

Arterial.—There is nothing to suggest that arterial damage plays any part in the production of deep thrombosis. On the other hand, some cases are associated with arterial occlusion and even gangrene of the limb. It is believed that the inflammatory

process, beginning outside the vein and leading to its thrombosis, also spreads through the wall of the artery and is followed by arterial occlusion, which is, however, quite unusual, and there is nothing in the evidence to suggest that it plays any part in the results now under discussion. The alternative view is that the arterial changes are due to spasm.

Lymphatic.—It seems almost certain that it is lymphatic occlusion that is responsible for the persisting œdema characteristic of practically all cases. This œdema is a characteristic feature of the period of onset, and also of the remote period. Its degree and extent show considerable variation, depending upon the severity of the obstruction. During the acute phase the whole of the lower limb is characteristically involved below the level of Poupart's ligament, and in some cases œdema can also be made out over the lower abdominal wall and the gluteal region. The extent of the œdema therefore corresponds approximately to the lymphatic drainage area of the lower limb, but there is nothing in the clinical evidence to suggest that an inguinal lymphadenitis is responsible for the result. In the remote stage the extent of the œdema shows extremely wide variations, in the mildest being present merely over the lower part of the shin after exercise, whilst in the most severe cases the whole limb is persistently œdematous and larger than its fellow.

Infectious.—If infection plays any part in leading to deep thrombosis, then the evidence suggests that it is mild and non-suppurative.

Composite.—The evidence here put forward suggests that in about a quarter of the cases the lymphatic obstruction has been associated with venous obstruction, as shown by evidence of the subsequent development of an abdominal collateral circulation. In view of the definition which has been given to the term collateral circulation, it may be that this phenomenon is possibly present in a larger group of cases than suggested in these figures. If such is actually the case, then the obstruction of the veins must be below the level of the saphenous opening.

Nervous.—In view of what has been said regarding the primary site of the pathological change in the perivenous tissues in these cases, it might well be that the inflammatory change involves the arterial sympathetic plexus. Nothing, however, in the subsequent history of these patients suggests that the sympathetic nervous system in the limb has been involved. Lériche (1931), on the other hand, has advocated peri-arterial sympathectomy for the condition.

* * * * * *

Considering the length of time which phlegmasia alba dolens has been known and described, it is surprising that so little is still understood about its morbid anatomy. Homans (1932) records two interesting cases relating to this aspect:

The first patient was a negro with a severe degree of "white leg" complicating pneumonia. An exploratory operation was carried out and the tissues around the left iliac vessels were grossly œdematous and "porky." The vessels themselves were found with difficulty. Arterial pulsation was present and the interior of the vein was filled with dark clean clot. A dramatic result followed this operation. On the following day the patient felt the tension lessen decidedly, and in three days the swelling had gone down remarkably. A second operation was carried out later on and the femoral sheath opened in Hunter's canal. In the second case recorded by the same writer, the sheath of the iliac vessels was converted into a nearly solid scar which involved both artery and vein.

There is nothing in the clinical evidence to suggest that ligature of the common or external iliac veins or the common femoral vein is followed by persisting œdema of the limb. Ligature of the main deep vein is followed by slight swelling of the limb with cyanosis, both of which changes clear up during the course of a week or so, but may be followed by the development of a collateral circulation. Persistent œdema is not a result of this operation.

The cases that have been described under the heading of "primary thrombosis of the axillary vein" may also shed some light on the subject. Axillary thrombosis, though at the time of onset there may be associated œdema and cyanosis of the limb, is not followed by persistent œdema. A collateral circulation may develop, the functional condition of the limb is usually perfect, and œdema is not a feature. This primary axillary thrombosis is in most cases traumatic; there is nothing in the pathology of these cases to suggest an inflammatory or lymphatic origin.

In a normal limb, arterial, venous, and lymphatic elements are essential to the preservation of the normal circulatory balance. Venous obstruction may be followed by a temporary swelling and œdema of the limb, but this does not persist. Lymphatic obstruction, on the other hand, is associated with some degree or other of permanent œdema. This œdema may follow cellulitis of the subcutaneous tissues, in which case the damaged lymphatics are the peripheral ones; it may follow inguinal adenitis of pyogenic, tuberculous, or other chronic type; or it may be associated with true elephantiasis of filarial origin.

Anatomically, the main and the largest lymphatic channels of the limb run in the deeper parts of the subcutaneous tissues immediately superficial to the deep fascia. It is doubtful, in the light of more recent evidence, whether there are beneath the deep fascia deeper lymphatic channels of any comparable size. These large superficial lymphatic channels in the lower limb pass upwards and pierce the deep fascia at the saphenous opening. From this point they then run in the perivenous tissues around the common femoral, the external, and the common iliac veins, in the loose connective tissue that surrounds these vessels.

Though the importance of the lymphatic system in inflammatory conditions is well known, the importance of its regenerative capacities is not often recognised in relation to surgery generally. If this lymphatic regeneration did not take place, practically all extensive operations, or for that matter injuries, would be followed by some degree or other of persistent lymphœdema.

This regenerative capacity has been demonstrated experimentally by Reichert (1926, 1931), who has shown that in animals it is possible to divide all the tissues of the limb with the exception of the bone, the main artery, and the main vein, and to study the phase of regeneration in the limb. In animals in which this experiment has been carried out, the maximum swelling of the limb is present on the 4th or 5th day, and has subsided completely by the 7th or 8th day. It was also shown that arterial vessels crossed the operative field about the 3rd day and that venous and lymphatic channels had not regenerated until the 4th day when the œdema was beginning to subside. It was also found that once the limb had reached its maximum swelling, or was just subsiding, the femoral vein, the only patent venous channel, could be ligated with impunity. In these circumstances neither gangrene nor further œdema occurred and the delay in the subsidence of the œdema was only one or two days. These experiments demonstrate the regenerative capacity of the lymphatics, the importance of the lymphatico-venous system in getting rid of œdema, and the fact that the main venous trunk can be ligatured with impunity.

The clinical condition most closely allied to that found in femoral thrombosis is the persisting œdema of the upper limb found in some cases in carcinoma of the breast. The evidence suggests that this is always associated with the lymphatic obstruction in the glands by malignant cells. It starts peripherally and is aggravated by posture and exercise. There is no collateral circulation nor any evidence of associated venous obstruction. It is doubtful if any extensive operation itself can ever be responsible for the condition.

Pulmonary emboli also throw light on this subject. Very few of the patients who come to post-mortem as the result of a pulmonary embolus have had an antecedent "white leg." The embolus is, as a rule, the first and final manifestation of a latent thrombosis. On the other hand, of patients who have a manifest "white leg" or deep femoral thrombosis, only about a tenth develop pulmonary emboli. The suggestion is put forward that in the former group the venous thrombosis is not associated with any perivenous change and the clot is but lightly adherent to the vessel wall. In the cases of manifest thrombosis, it is suggested that a perivenous lymphangitis is the primary condition and that this is followed by phlebitis and secondary thrombosis of the vessel. In these circumstances the thrombus is closely adherent to the vessel wall as the result of the local inflammatory change, and for these reasons is much less likely to migrate and give rise to embolism.

SUMMARY

1. A series of 85 cases of femoral thrombosis is reported as part of a series of 1300 cases of peripheral vascular or lymphatic disease. In all of these there was a definite cause, an acute onset, and a varying period of disability.

2. The present paper is concerned especially with the ultimate clinical results of deep thrombosis.

3. In the 85 cases recorded, the thrombosis was associated with parturition or abortion in 39, with the post-operative state in 17, with typhoid fever in 12, and with infections of the lungs or pleura in 7. The remaining cases were associated with influenza, phlebitis, fracture, ulcerative colitis, and erysipelas.

4. The condition was unilateral in 64 cases and bilateral in 21. In the unilateral cases, the right side was involved in 18 and the left in 46.

5. The clinical sequelæ included discomfort and pain, œdema, varicosities of the limb or the trunk, and changes in the skin and subcutaneous tissues of the nature of dermatitis, ulceration, phlebitis, periphlebitis, and scleroderma.

6. Typically, the patient is left with a functionally damaged limb which is a constant source of discomfort, disability, and anxiety. In general, the degree of disability is proportionate to the amount of œdema.

7. In no patient in the series did the limb return entirely to normal. In 2 cases the evidence suggested a pure thrombosis, in 61 a pure lymphangitis, and in 22 a combination of thrombosis and lymphangitis.

8. The nature and extent of the abdominal collateral circulation developing in these cases are analysed.

9. Ulceration of the limb was present at some time or other in 26 of the 85 cases (30·6 per cent.). These ulcers were chronic and intractable and associated with extensive inflammatory changes.

10. Attacks of phlebitis occurred in 9 of the 85 cases (10·6 per cent.), either in single attacks or in the form of recurrent attacks.

11. Treatment is discussed in relation to the acute, transitional, and remote periods, and the treatment of varicosities and of ulceration is also considered.

12. The incidence of femoral thrombosis is discussed and it is estimated that some 5000 cases occur annually in this country. The various ætiological and pathological features of femoral thrombosis are reviewed as well as the experimental evidence in this connexion.

13. The clinical evidence supports the view that lymphatic obstruction is responsible for the œdema which is a characteristic feature of femoral thrombosis at all stages of the disease. From the experimental evidence, venous ligature will not produce œdema.

14. In patients dying as the result of a pulmonary embolus, the embolus is, as a rule, the first and final manifestation of a latent thrombosis, and few have had the clinical manifestations of an antecedent "white leg."

15. It is suggested that in cases of manifest femoral thrombosis a perivenous lymphangitis is the primary condition and this is followed by phlebitis and secondary thrombosis of the vessel. In these circumstances the thrombus is closely adherent to the vessel wall.

16. In latent thrombosis that is without clinical manifestations, the thrombosis is not associated with any perivenous change and the clot is but lightly adherent to the vessel wall. For this reason emboli are likely to occur.

17. The difficulties of nomenclature in connexion with the term "femoral thrombosis" are discussed.

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Clinical and Laboratory Notes

SULPHANILAMIDE IN THE TREATMENT OF ACTINOMYCOSIS

By Oliver Walker, M.B. Liverp.
R.A.M.C.

The following case is of interest not only as an example of a veritable deluge of afflictions but because of the dramatic improvement following administration of sulphanilamide. I do not claim that post hoc est propter hoc even if the agent is sulphanilamide, but in view of the apparent cure of a very fatal condition, I must recommend that this remedy be given a trial in the treatment of actinomycosis.

A. B., aged 23, a soldier, was admitted to the Queen Alexandra Military Hospital, Millbank, in September, 1937, with a gangrenous appendix. A persistent discharging sinus ensued and this was explored in November but failed to close. At this time he was found to be suffering from a pituitary tumour, which manifested itself by headaches, almost complete bitemporal hemianopia, diminution of visual acuity, absence of hair on the face and body, eunuch type of hands, round forearms, and a tendency to a female distribution of fat. In December he had an attack of tonsillitis which was followed by nephritis and mastoiditis. Actinomyces were first demonstrated

in the pus from the discharging abdominal sinus on Feb. 1st, 1938, when a mass filling the right iliac fossa was readily palpable. Potassium iodide and later Lugol's iodine were administered without apparent benefit. On March 3rd the discharge was as profuse as ever and "sulphur granules" showing typical filaments of actinomycosis microscopically were readily demonstrable.

From March 4th to 10th inclusive sulphanilamide, 1·0 gramme thrice daily by mouth, was administered, and this treatment was rapidly followed by lessening of the purulent discharge and disappearance of "sulphur granules." So remarkable was the result that the treatment was repeated on March 20th for a further five days. On March 29th there had been no discharge for four days and the sinus had closed. Deep X ray therapy to the pituitary region was then begun and iron was given for the secondary anæmia. I saw the patient again on May 12th, when the abdominal wound was firmly healed, the mass in the right iliac fossa had entirely disappeared, the abdominal discomfort had vanished, and the general health was greatly improved.

I wish to acknowledge, with thanks, permission granted by the Officer Commanding, Queen Alexandra Military Hospital, Millbank, S.W.1, to record this case.

PREGNANCY FOLLOWING INDUCED CYSTIC CHANGES IN THE OVARIES

BY G. VAN WAGENEN, Ph.D.
AND
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GONADOTROPHIC preparations can induce growth and cystic changes in the ovaries of the common laboratory mammals. During the earlier years of reproductive life they may cause similar changes in women [1] and caution has been advised,[2] and should still be urged, in the use of potent gonadotrophic extracts lest the ovaries suffer some irreversible deleterious change. We have been able to collect certain data on the duration of the effects brought about in the primate ovary by two types of gonadotrophic substance, the one an extract of sheep pituitary and the second derived from the serum of pregnant mares. Both preparations are used clinically, and both are assayed in terms of mouse or rat units.

Our observations were made on four immature and young adult rhesus monkeys (*Macaca mulatta*) which became pregnant at various times after they had been subjected to intermittent or daily injections of large amounts of the extracts. The first animal was given 8250 R.U. of a gonadotrophic extract of sheep pituitary on the 23rd day of its second observed menstrual cycle. Uterine bleeding began three days later and lasted three days. From the 4th to the 10th day of its fourth observed cycle it was given 750 R.U. of the same extract daily (total 7500 R.U.). At laparotomy two days after the last injection both ovaries were found to be cystic and greatly enlarged. The left ovary was removed. Uterine bleeding did not begin again until 27 days later. It is likely that the long interval between the unilateral ovariectomy and the ensuing menstruation was due to a high level of œstrogenic secretion maintained by the remaining cystic ovary. The monkey was given a similar course of injections six months later, but on this occasion uterine bleeding began the day after the last of the ten injections. Four months later the animal was successfully mated, pregnancy occurring in spite of the fact that it possessed only one ovary which on two, and possibly three, occasions had been made cystic by excessive gonadotrophic stimulation.

The second animal was given two injections of mare serum (400 R.U. and 1500 R.U. respectively), the injections being separated by a six-month interval. Shortly after the second injection it was mated only once and pregnancy supervened. The third and fourth animals, which were much younger, received 75 R.U. and 300 R.U. of mare serum daily over periods of six months and eight months respectively, during which time they matured and began to have regular cycles. These animals were not mated until after the injections were discontinued. They became pregnant in spite of the fact that early menstrual cycles in the rhesus monkey are usually anovulatory. In each case an exploratory laparotomy had demonstrated that the initial effect of the injected hormone was to enlarge the ovary to four or more times its normal size. It thus follows that both the cystic ovarian condition and the consequent disturbances in the menstrual rhythm which are caused in monkeys by gonadotrophic hormones are only transitory, and that they can be followed within a short time by normal pregnancy and normal lactation. These observations on monkeys are in harmony with observations which have been made on rabbits, rats, and other laboratory mammals.

This investigation was made possible by a grant from the fluid research funds of Yale University school of medicine. An extract of sheep pituitary for experimental use was generously supplied by Dr. Oliver Kamm of Messrs. Parke, Davis and Co., and mare serum, untreated except for being passed through a Berkefeld filter, was furnished by Dr. H. H. Cole of the University of California.

[1] Kurzrok, R., and Smith, P. E., Chap. XVII in The Pituitary Gland, Baltimore, 1938.
[2] Editorial: Clinical Application of Hormones of Anterior Pituitary and Gonads, *J. Amer. med. Ass.* 1936, **107**, 1390.

VIENNA AND ENGLISH MEDICINE

THE history of medicine has some pleasant byways, and one of these has recently been explored by Dr. William Steedman, who has published a short review in the *Wiener Medizinische Wochenschrift* (1938, No. 14) entitled "English influence on Viennese medicine in the 18th century." He is concerned chiefly with the evidence afforded by the medical journals published in Vienna: the first of which, Kirchvogel's *Physical and Medical Diary* began in 1773 and lived into the 19th century. Kirchvogel proclaimed himself a follower of Sydenham, and his abstracts and criticisms were largely a reflection of English theory and practice. Later journals followed much the same path and up to the end of the century Vienna received the bulk of its foreign medical information from English sources. Dr. Steedman thinks that the original cause which led to this close relationship was that the two great schools of Vienna and of Edinburgh were both founded by pupils of the great Boerhaave: Edinburgh in 1726 and Vienna in 1745. Moreover Boerhaave himself was an eminent pupil of Archibald Pitcairn in Leyden, and Pitcairn was an enthusiastic follower of Sydenham. As late as 1786 Sydenham's works were translated into German at Vienna by Mastalir, who gave the first impulse to the study of pædiatrics in Vienna. The story serves to remind us that even in a Europe distracted by wars medical science was already an international bond.

MEDICAL SOCIETIES

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION

AT a quarterly general meeting of this association held on March 20th, with the president, Dr. DOUGLAS MCRAE, in the chair, a discussion on the alleged

Shortage of Medical Officers in Mental Hospitals

was opened by Dr. J. A. F. DENYSSEN. It was agreed on all sides, he declared, that in most mental hospitals insufficient individual attention was being paid to patients who clearly needed it. The cause was the inadequacy of the medical staff, aggravated by the heavy and increasing burden of routine work. Recent valuable advances in psychological medicine were therefore not being used. Knowledge had increased greatly in the last twenty years but treatment had hardly improved at all. Cardiazol therapy had made great strides on the Continent and was being tested in several hospitals; but, as authorities pointed out, an indispensable part of the treatment was psychotherapy, to enable the patient to understand and digest his psychic experiences during the treatment. Inadequate staffing made psychotherapy largely impossible. Routine work included ward visits and rounds, statutory mental and physical examinations, care of the physically sick, reports, lectures, interviews with relatives, instruction of nurses, participation in recreational activities, and dealing with everyday problems. These duties were continually augmented by an increasing number of operations at which the assistants had to coöperate with visiting specialists. Holiday leave reduced the strength over a considerable part of the year. Sir Laurence Brock, chairman of the Board of Control, had pointed out two years ago [1] that adequate staffing of mental hospitals would not only enable medical officers to give patients more individual attention and treatment but to undertake more clinical and pathological research. They needed also more leisure to keep abreast of advances and to attend meetings, clinics, and refresher courses. The present deadening atmosphere (said Dr. Denyssen) was bad for work and destroyed the interest of mental hospital officers in the service. Clinical material was available in abundance for coöperative psychiatrical research if advantage were only taken of it. The staff should be encouraged to be non-resident, so that they might form freshening social contacts. To attract the right type of man the service must be made a career, with reasonably good remuneration and prospects of promotion. At present the higher posts were all administrative, and a man whose chief interests were clinical could find no opportunity for advancement. The services of promising clinical and research workers were lost through their absorption into the administrative machinery. It was the duty of members to initiate progressive steps rather than complacently to wait for evolutionary processes to solve their problems. The public must be educated to produce the required financial support. Superintendents were in a strategic position, for they were in close contact with lay officials and committees.

A paper by Dr. A. G. DUNCAN was read by Dr. W. G. MASEFIELD, the honorary secretary. Dr. Duncan also quoted observations made by the chairman of the Board of Control on the depressing steadiness of the recovery-rate and the shortage of medical staff. The normal proportion in this country was one doctor to 350 patients, and a ratio of 1 in 450 or 500 was not unknown. In continental hospitals one doctor was provided for each 160 patients or even less. Dr. Duncan saw little value in any attempt to estimate by simple proportion the minimum number required. He proposed a formula which would also take into account the size of the hospital and the admission-rate; one doctor for every 500 patients, plus one for every 150 admitted every year, plus one if the hospital had more than 2000 beds. Arithmetically, the medical superintendent did not count, for his clinical work did not lessen that of the assistants. On this basis, a hospital of 1060 beds with an admission-rate of 245 required a minimum of four assistants, and one of 2550 beds with 400 admissions a year required 9 assistants. Out of 42 local authority hospitals, 12 appeared from the figures for 1936 to have the minimum staff, 19 had one less, 4 had 2 less, and 7 had more than 2 less. Sir Laurence Brock attributed the shortage largely due to lack of imagination on the part of the visiting committees. Dr. Duncan pointed out, however, that it was by no means easy to secure and retain doctors of the standard required. With some difficulty, more or less unsatisfactory locum tenents could be found. The reasons why good men left the service were many. Routine work was apt to be uninteresting and uninspiring, and the assistant could not often find any interest outside the ward work which would keep him from intellectual stagnation. This interest need not necessarily be called research or be done in the laboratory. Research was not necessarily highly specialised work. It would be most unfortunate if younger medical officers were given the impression that the elucidation of psychiatric problems was no concern of theirs. Every assistant medical officer should be a research worker in the broader sense. The wards and the record office provided ample material. It was sometimes asked why this country had not produced a Freud, a Jung, or a Janet. There was some significance in the reflection that only one or two of the outstanding continental psychiatrists had influenced by their work the recovery-rate of psychotics. The policy of appointing lay administrators was impracticable and would not be welcomed by assistant medical officers.

The PRESIDENT said that he felt particularly strongly on the subject because, being interested in research, he had spent many years as an assistant medical officer at the Maudsley Hospital at £100 a year and his contemporaries had in course of time fulfilled the only possible ambition of an assistant medical officer; to be made a superintendent and to marry. He blamed the Board of Control for imposing on medical officers a mass of useless routine work which destroyed what intellect they might possess. Assistants nowadays seemed to spend their whole leisure outside the hospital. He hardly ever met one who would really get down to work, or would consider any kind of research without being given not only the idea but also a detailed technique. Every medical superintendent would welcome and encourage an assistant who was keen on research. In county asylums the recovery-rate had dropped because so many of the cases admitted had been tinkered with outside in a variety of ways until their hope of recovery was gone. Mental hospitals were

[1] See *Lancet*, 1936, **2**, 149.

said to produce a lower recovery-rate than medical or surgical clinics, but these did not keep their failures.

Dr. E. J. FITZGERALD recalled the report of a committee appointed by the association in 1914, which might appropriately be read to-day. In the Irish service assistant medical officers were allowed to marry. The more assistants recruited, the fewer would have the chance of becoming superintendents and getting a living wage. Too large a gap existed between the remuneration of a superintendent and of his deputy. He would advise any son of his to keep out of the service; its members were looked down upon by other medical men as failures, and some superintendents would provide no facilities for research and even forbade it. He advocated the appointment of house physicians—not clinical assistants at £60 a year, and not the kind of men to whom incipient mental cases were sent—men on the fringe of Harley-street who did not know a psychotic, and certainly did not know a mental defective, when they saw one.

Dr. J. J. B. MARTIN said that when he had asked his committee for more staff for his hospital, they had suggested that the present establishment of four assistant medical officers for 1200 patients was too many, on the basis that the public assistance institution containing 900 patients and a similar number of new admissions annually was run perfectly well by one medical officer. To the further criticism that the new treatments had made no fraction of difference in the recovery-rate and that there was no work in a mental hospital for an efficient doctor, Dr. Martin had replied that his assistants had considerably less clinical work than an ordinary general practitioner and spent most of their time compiling useless statutory notes which they realised would only be relegated to the cellar unless some special inquiry were held. The committee had refused to pay medical men for doing work which a clerk could do. They pointed out that 80 per cent. of the recoveries were in the first-year admissions, and were prepared to spend as much as they could afford on work for these patients and for research. The hospital had made no appreciable contribution to medical science for years, and this was true of the average mental hospital. The conclusion was that medical work was much more valuable outside the hospital than inside. Extramural activities should be largely extended, and then the complaint of the assistant that he had nothing to do worth doing would pass away.

Dr. K. C. BAILEY pointed to the difficulty of obtaining cases early enough for the new treatments. In a Swiss hospital he had visited, which contained nine resident doctors for 1000 patients, the staff did much less routine work and much more psychotherapy. There was probably not a mental hospital in this country which did any real psychotherapy, through lack of training and time. The sterile atmosphere of the mental hospital was largely the fault of the medical superintendent.

Dr. DONALD BLAIR supported the proposal to appoint house physicians, as this would give a number of general practitioners badly needed knowledge of psychiatry and induce them to send their cases earlier. A system of clinics should be established in connexion with mental hospitals; the work in them would add much interest to the life of the assistant. In some county areas with more than one hospital an incalculable amount of research work could be done in organised coöperation.

Dr. W. J. T. KIMBER said that the number of his assistants exceeded that laid down by Dr. Duncan's formula. He had six assistants, two of whom ranked as house physicians, a pathologist, and four psychiatric social workers. Neither he nor his committee regarded the number as excessive. There was much clinical work to be done in a mental hospital, and attendance at social functions was a definite part of therapy. His hospital also had six visiting psychotherapists who instructed the junior medical officers. House physicians served for twelve months, and received a grounding in the work of practical psychotherapy, to some extent on analytical lines. His assistants were keen, did not work as hard as the average general practitioner, and gained a much better approach to their patients' minds.

Dr. A. A. W. PETRIE advocated the establishment of psychiatric units with teams of full-time workers on various problems. Each assistant ought to be given definite work apart from routine, perhaps outside the hospital, or on clinical or pathological problems, or on occupational therapy or psychotherapy.

Prof. D. K. HENDERSON said that one difficulty was that most assistants desired to spend time reading for their D.P.M. or M.R.C.P. There were many cogent arguments against numerous specialised degrees as a requirement for appointments. Out-patient departments and psychiatric clinics had to be developed to deal with early cases, but the bulk of psychiatric work would always be done in the mental hospital. Assistant physicians trained to look upon patients as biologically faulty adaptations and not as pathological specimens would have a stimulus to clinical work. Clinical staff meetings would remedy the present preoccupation of the superintendent with administrative duties. Nothing was more stimulating or constructive to the younger men than staff meetings at which new admissions were discussed, the assistant first presenting the case.

Sir LAURENCE BROCK said he had never intended to suggest that the proper proportion of medical staff to patients could be found by a mathematical formula. The only scientific method was to consider how many wards in the particular hospital a medical officer could take. The out-patients and the new admissions were not the only patients requiring psychiatric attention. Much psychotherapy ought to be done even among chronic cases. He had hoped to hear more about the appointment of part-time medical officers, particularly in clinics. An experiment on those lines might do something to meet the criticism that many out-patient clinics were mainly diagnostic and did not do continuous psychotherapy. Committees might be more ready to agree to the appointment of part-time officers, who would not be pensionable. The plan might also provide for more psychiatrists in private practice, a very grave need. Medical men were apt to regard the psychiatrist as to some extent inferior through being in a safe occupation. There was room for a more adventurous spirit in psychiatric medicine.

Dr. DONALD ROSS pointed out that advertisements of vacant mental hospital appointments attracted no applicants.

Dr. BLAIR said that to gain promotion he would have to take his M.R.C.P. He would gladly do this, but could not without taking a course that would swallow up the leave due to him on full and half pay and necessitate more leave without pay. He would have to give up his work on Cardiazol and insulin.

Some candidates for posts were told that an M.D. Lond. in psychiatry was not enough. The fighting services paid their medical officers to take advanced qualifications.

Dr. C. J. C. EARL asked who would teach the young assistant. The superintendent had too much administrative work. The real reason why psychological treatment was not given by assistants was that the superintendent did not want them to give it. The only chance for a man who wanted to do special work was to retire to the laboratory.

Dr. E. O. LEWIS declared that an assistant could not give adequate treatment to each patient under present conditions. There was work in every large mental hospital for a full-time psychotherapist. Chronic patients needed time spent on understanding their everyday problems.

Sir HUBERT BOND asked whether there was a shortage of officers for work that was really needed. The "routine work" at present demanded was in the interests of the patient. To record the examination of a patient was considered indispensable in other branches of medicine. It was a necessary foundation for the next step in treatment.

Dr. L. W. RUSSELL said he selected patients who would best benefit by personal treatment.

Dr. R. PAKENHAM-WALSH suggested that routine records should not be relegated to the cellar but should be used as material for research. Work on spontaneous remission in schizophrenia could not be done without them.

Dr. J. I. RUSSELL said that conditions had not improved since 1912. He had three assistants for 1000 patients, and one was on holiday for a large part of the year.

Prof. J. H. MACDONALD said that the ideal mental hospital should not hold more than about 700 patients. Smaller hospitals would mean more medical superintendents.

TUBERCULOSIS ASSOCIATION

AT a meeting of this association, held in London on May 20th, the president, Dr. S. R. GLOYNE, being in the chair, a discussion on

Trauma and Tuberculosis

was opened by Dr. J. BROWNING ALEXANDER who confined his remarks to trauma in relation to *pulmonary* tuberculosis, defining trauma as "injury caused by external violence." Since tuberculosis could be caused by no other agent than the tubercle bacillus, what they had to consider was, how trauma could (1) reactivate an old quiescent lesion, or (2) aggravate an already existing infection. Of reactivation there was ample clinical evidence, but experimental confirmation was scanty and difficult to obtain. In a patient already suffering from pulmonary tuberculosis, especially one with long-standing chronic disease, a blow to the chest wall might result in a severe hæmorrhage and dissemination of tubercle bacilli to hitherto unaffected parts of the lungs. The time-interval was important. Serious aggravation showed itself in three or four days after the accident, by fever and X ray appearances of freshly developed broncho-pneumonia. A spread demonstrated for the first time three or four months later was not likely to be due to the hæmorrhage. Trauma when followed immediately by pneumothorax or pneumopericardium must be admitted as causing aggravation of a pre-existing lesion. The usual causes of spontaneous pneumothorax were ulceration of a subpleural tubercle, rupture of an emphysematous bulla, or tearing of an adhesion immediately above the diseased portion of a lung. Apart from stabbing or fracture of a rib, a healthy lung did not rupture. Another form of tuberculosis which might reasonably be attributed to trauma was miliary tuberculosis, as in a case cited by Parkes Weber, where a blow on the testicle led to the dissemination of tuberculosis in the lungs; or in another case where miliary spread took place after forcible manipulation of a tuberculous joint. More difficult cases were those in which pulmonary tuberculosis arose after trauma to a part of the body outside the chest. For example, a man with a fractured femur might become debilitated from prolonged residence in hospital and succumb to tuberculosis at a later date. In such a case the causal relationship would have to be decided by consideration of the sequence of events in the interval. The complete absence of signs or symptoms of tuberculosis for (say) three months after an accident would negative any causal relationship between the two events.

Dr. J. G. JOHNSTONE spoke of trauma in relation to tuberculosis of *bones and joints*. A study of their blood-supply was important. The minute vascular arrangement at the epiphysis and metaphysis of bones was different from the diaphysis. Although the blood-vessels were abundant, the minute arterial capillaries terminated in a widened bay with a poor venous return, and there was a distinct diminution of the phagocytic cellular elements of the blood, in contrast to the medulla, where the blood-supply was not only abundant and rapid, but was also rich in cellular elements. A combination of sluggishness in the blood stream and lack of phagocytic elements in any site rendered it more vulnerable to hæmatogenous infection—a vulnerability which was obviously increased by trauma. In acute infections the relationship was more easily established than was the case with tuberculosis. If any relationship existed between trauma and tuberculosis of bones and joints it was usually in association with a minor injury. He could not, he said, recall a single case of gross joint injury that developed tuberculous arthritis in the injured part. From the many hundreds of cases that had passed through his hands, he placed trauma as a causal factor in from some 15–20 per cent. In four other groups of cases it was easier to incriminate trauma as the predisposing cause owing to the reduction or absence of time lag between the injury and the appearance of clinical symptoms. These groups were: (1) traumatic inoculation of tubercle bacilli; (2) traumatic exacerbation of a latent but active lesion; (3) traumatic aggravation of a known active lesion; (4) traumatic reactivation of an old healed lesion. In all these groups the X ray evidence of mischief was more conclusive. Trauma, he concluded, must be regarded as a definite predisposing cause of tuberculous disease of bones and joints; the chief difficulty was to decide when it was the main factor.

LEGAL ASPECT

Mr. C. A. COLLINGWOOD, barrister-at-law, said that tuberculosis being a specific bacterial disease its local traumatic inception implied: (1) that the bacillus had been directly introduced into the system; (2) that the bacillus was already present, lying dormant in the tissues, and that the injured part

was for the time being a locus minoris resistentiæ; or (3) that a pre-existent though quiescent tuberculous lesion had been aggravated. The majority of claims in respect of tuberculosis consequent upon trauma were brought under the Workmen's Compensation Act, in which the word accident was used in the ordinary sense of any untoward and unexpected event which occasioned hurt or loss. If the workman could show that his disease was a consequential result of accidental circumstances arising out of and in the course of his employment he would be entitled to compensation. Injury by disease alone, unaccompanied by accidental circumstances, was not one for which compensation could be claimed, except under the provisions of the Act relating to scheduled industrial diseases or to silicosis or asbestosis; nor did the fact that one man was more susceptible to infection than another constitute an accident. But given an accidental occurrence, the fact that at the time of the occurrence the man was suffering from a condition which made him more susceptible to injury would not prevent the occurrence from being accidental. The test applied was whether in substance the accident came from the disease alone, so that whatever the man had been doing it would probably have come all the same, or whether the employment contributed to it. In some cases distinction had to be drawn between aggravation and acceleration of the disease. When death resulted from the injury, it was immaterial that the deceased was suffering from such a condition of tuberculosis as would certainly have proved fatal in a short time, apart from the accident. This was because compensation in the case of death was a lump sum payable to the dependants of the deceased, thus differing from compensation for incapacity, payable weekly during incapacity. Where the effect of accident on a man already suffering from tuberculosis (or any other disease) was to accelerate the disease, so that he was put into a condition of incapacity sooner than he would otherwise have been, then the incapacity due to the accident would not last beyond that date at which he would in any event have been incapacitated. The question whether in a given case death or incapacity resulted from the injury resolved itself into a purely medical inquiry into the chain of causation, and whether this chain was broken by a *novus actus interveniens*. In the latter case the man could not succeed.

Anæsthetics in Thoracic Surgery

Opening the second discussion Dr. J. T. HUNTER said that in thoracic operations the *anæsthetist* was faced with greater difficulties than in any other branch of surgery, owing partly to technical problems, partly to the fact that the patient was debilitated or toxic from long-standing illness, and had a lowered vital capacity. No one method of anæsthesia could be suitable for all cases; the anæsthetist had to decide whether to use local infiltration, general anæsthesia, or special analgesia, alone or combined with intravenous or inhalation anæsthetic. In intrapleural operations such as pneumonectomy or lobectomy there was the further question of using intratracheal or intrabronchial intubation with suction. Preliminary medication should be light; it was undesirable to diminish the cough reflex to any extent. The most useful combination was probably Omnopon gr. ½ with scopolamine gr. 1/150 three-quarters of an hour before operation. Local anæsthesia was less often used in this country than on the Continent. The high spinal analgesia—Howard Jones technique modified by Magill and Rink and Harris—had proved excellent in lower lobectomy and thoracoplasty. The chief advantages of spinal anæsthesia were: (1) bleeding was reduced to a minimum; (2) the cough reflex was unimpaired; (3) respiration was undisturbed. Post-operative headache sometimes occurred. The fall in blood pressure could be met by intravenous injection of ephedrine. General anæsthesia was more commonly used in this country. Ether was quite unsuitable in thoracic surgery. Chloroform or divenyl ether might be useful adjuncts to gas-oxygen which alone was often inadequate to keep up a steady anæsthesia. Cyclopropane was nearly ideal, as it could be given with a high percentage of oxygen; it was non-toxic, non-irritating, and rapidly excreted; induction was rapid and pleasant, and the cough reflex could easily be maintained. It did, however, increase the bleeding and prolong the operation time. For the induction of A.P., resection of rib for empyema and operations on the phrenic nerve, local infiltration (novocain 1 per cent.) was suitable. For thoracoplasty he still used gas-oxygen combined with careful premedication. When the rib resection was actually started, 1½ litres of tap water with glucose were run into the rectum. For apicolysis and extra-pleural pneumothorax, where quiet respiration and a minimum of movement must be aimed at, cyclopropane had proved superior to gas-oxygen. When thoracotomy was in question for abscess, carcinoma, or mediastinal tumour, spinal anæsthesia might be suitable where there was little or no sputum. With copious sputum, tracheal or bronchial intubation should be used. At the Brompton Hospital bronchoscopy was always carried out under local anæsthesia, with preliminary omnopon and scopolamine.

Mr. J. B. HUNTER, speaking from the point of view of the *surgeon*, said that an anæsthetic should be safe, should not upset the patient mentally, should reduce movement to a minimum, and should not give rise to complications. Local anæsthesia was doubtless the safest, and was usually combined with morphia, omnopon and scopolamine, or Nembutal. Ether was quite unsuitable for lung cases, but was valuable in operations on the heart, especially cardiolysis, where basal narcotics were best avoided. Gas-oxygen, although safe, had the disadvantage of causing considerable respiratory movement. This, however, could be largely overcome by adequate CO_2 absorption arrangements and the proper administration of basal anæsthetics. Cyclopropane, of which he had little experience, could not, except with an absolutely closed circuit, be used with diathermy. Hæmorrhage appeared to be much greater with cyclopropane than with other forms of anæsthesia. Relaxation was not a necessity in chest surgery, and spinal anæsthesia was not free from post-operative complications. Of the basal anæsthetics he believed Avertin to be the best. The patient was unconscious and was readily controlled with gas-oxygen, while the cough reflex was never abolished. The use of atropine, while necessary where ether was employed, was harmful with other anæsthetics, producing a type of extremely viscid mucus impossible to expel; it was in his opinion a possible cause of atelectasis. He was in favour of passing an intratracheal tube, which gave a better controlled and quieter anæsthesia than with the gas mask alone. Passing a suction catheter into the bronchus of the affected side was, he thought, harmful, aspirating not only mucus but air from the bronchial tree with consequent collapse. Suction should be confined to the trachea where a small catheter could not produce enough negative pressure to do harm.

REVIEWS AND NOTICES OF BOOKS

Collapse Therapy of Pulmonary Tuberculosis

By JOHN ALEXANDER, B.S., M.D., F.A.C.S., Professor of Surgery, University of Michigan; Surgeon-in-charge, Division of Thoracic Surgery, Department of Surgery of the University. London: Baillière, Tindall and Cox. 1937. Pp. 705. 67*s*. 6*d*.

As a contribution to thoracic surgery this book deserves commendation as much for the industry expended in its composition as for the completeness of its contents. It tells the story of the collapse therapy of phthisis from the beginning until the present day, weighing carefully the pros and cons of each individual operation and its modifications and indicating its sphere of usefulness either alone or in combination with others. It opens with an account of the improved results that have attended the use of collapse therapy in conjunction with sanatorium régime, and we are reminded (should our leanings be too conservative) that 85 per cent. of the cavities which remain patent kill their hosts within three years. In two excellent chapters on the physiology and pathology of pulmonary collapse Dr. Max Pinner deals effectively with an important aspect of the problem that is often neglected. The various procedures are then described in detail, Dr. J. B. Barnwell and Dr. K. S. Howlett, jun., contributing articles respectively on pneumothorax and oleothorax. The section devoted to the extrapleural pneumothorax is already out of date, and the author's statement that this measure is unlikely to find favour is certainly not true in this country to-day, although it may well be so to-morrow. It is a pity, also, that the work of J. Holst and C. Semb was published too late to receive more than a footnote of recognition. Semb's operation of extrafascial apicolysis with thoracoplasty may not appeal to every thoracic surgeon, but it was certainly an advance towards attaining selective concentric relaxation of the diseased area of lung which is the basic principle underlying collapse procedures to-day. Following chapters recounting the surgical drainage of cavities and the treatment of tuberculous empyema the book closes with an extensive bibliography.

The publishers should note that the use of a large page with fairly small print running right across it without a break is tiring for the reader; but this defect is offset by the excellence of the subject matter.

Précis de diagnostic chirurgical

By CH. LENORMANT, Professeur de Clinique Chirurgicale à la Faculté de Médecine de Paris; PIERRE WILMOTH, Professeur Agrégé à la Faculté; JEAN PATEL, Chirurgien des Hôpitaux de Paris; GEORGES MENEGAUX, Professeur Agrégé à la Faculté; and JEAN SÉNÈQUE, Professeur Agrégé à la Faculté. Paris: Masson et Cie. 1937. Pp. 2846. In 4 volumes. Frs.390.

THESE four handy volumes describe surgical diagnosis in some detail. The information they contain is easy to find, up to date, and simply and clearly set out. The books are illustrated by good photographs and particularly by good radiograms, each accompanied by a fully labelled outline explanatory drawing. The value of the book is enhanced by the short reference to the accepted treatments for the various conditions differentiated. Not many English undergraduates would be disposed to study a book on diagnosis of this size in a foreign language, but for the practising surgeon, and particularly for those engaged in teaching surgery, it provides pleasant, interesting, and profitable reading. It is in fact a very good treatise on surgical diagnosis, and although the whole work is long there is no useless repetition.

Appendicitis

By W. H. BOWEN, M.S. Lond., F.R.C.S., Surgeon to Addenbrooke's Hospital, Cambridge; Examiner in Surgery, University of Cambridge. Cambridge: At the University Press. 1937. Pp. 201. 7*s*. 6*d*.

THIS is not a book for surgeons, but some practitioners may profit from reading it. It is a good straightforward clinical account of appendicitis, but it brings no new clinical facts to light, it does not supply large statistical data or any new knowledge that would help to solve some of the problems appendicitis still presents. With much that the author writes we cordially agree. It is good to read his warning against the very early emergence from bed after the operation, his sensible comments on the question of drainage, and his recommendation to remove the appendix whenever possible in the presence of abscess. But when it comes to the complications which may arise we find his message indecisive and unhelpful. For instance, mechanical obstruction after the operation may be a rare but it is a very real problem; the clinical account of this condition is very meagre and the statements on its pathology and treatment quite vague. We cannot agree (p. 142) that "if a definite collection of pus in Douglas's pouch is found" when convalescence is disturbed by persistent fever "it is difficult to decide what is best to be done." The fact that the author has so little to say about complications does credit to the clinical acumen and prompt action of the practitioners in his neighbourhood; but his readers may be less fortunate and are likely to be disappointed if the difficulties that may arise following laparotomy and appendicectomy are not fully discussed in a monograph of this kind.

Wheeler and Jack's Handbook of Medicine

Tenth edition. Revised by JOHN HENDERSON, M.D., F.R.C.P.S. Glasg. Edinburgh: E. and S. Livingstone. 1937. Pp. 703. 12*s*. 6*d*.

CRITICS and reviewers are reminded in the preface that this tenth edition of an old favourite only claims to be a handbook and not a text-book of medicine. As it is a volume of convenient size, well bound and printed, and issued at a very reasonable price, this distinction should be borne in mind; but in scope, utility, and length it must face comparison with the shorter text-books, unfortunately to its disadvantage. As a clear synopsis of modern medicine and as a ready reference for the student it has now been bettered and the advantage of its light weight is overbalanced by the heaviness of its style which savours of the era of the top hat. Few modern practitioners use the word gastroxynsis and the understatement that X ray examination in the diagnosis of pulmonary tuberculosis is "often helpful" is not only out of date but dangerous. Equally misleading, to choose another example, is the section on bronchiectasis where the student will find that "incision and drainage of the cavities have often proved

successful," and yet no mention of postural drainage. The sections on the anæmias and on gastric disorders have been rewritten, but even here in the differential diagnosis of cancer of the colon and rectum diverticulitis is ignored. In other places throughout the book many additions indicate the care the reviser has taken in his difficult if not impossible task.

Eyestrain and Convergence

By N. A. STUTTERHEIM, M.D. Rand, Part-time Ophthalmic Surgeon to the Johannesburg School Clinic, Transvaal Education Department; late Assistant, Eye Clinic, University, Leyden. London: H. K. Lewis and Co. 1937. Pp. 89. 7s. 6d.

Dr. Stutterheim's conception of convergence is that it represents an autonomic power of the mind (or brain) which manifests itself in the basic movement of the dual eyes and forms the kinetic principle of bifoveal single vision; according to this idea convergence acts by visual reflexes only and not through volition or indeed consciously at all. His thesis is that the human eyes, being, in the primary position, not parallel but divergent, have in this position stability and perfect elasticity. The extrinsic ocular muscles act as tensors and not as antagonists. Convergence is brought about as much through the inhibition of opposing muscles as through contraction of the convergence muscles, though during vision the muscles of convergence are kept in constant action. These ideas are the grounds for Dr. Stutterheim's belief that convergence has a kinetic factor and that its basic movement is the kinetic principle of human binocular vision. This power of convergence is phylogenetically young and in some cases is unable to stand up to the visual requirements of modern civilised life. A breakdown is manifested by eyestrain, headaches, photophobia, amblyopia, and in severe cases by contracted visual field. The author has shown that the power range of convergence is more than twice as great in normal persons as in those suffering from eyestrain, and his demonstration that eyestrain is often accompanied by a poorly working kinetic reflex of bifoveal or human binocular vision lends support to his thesis.

The technique of investigating, diagnosing, and treating cases of eyestrain which have no refractive error is clearly described. Dr. Stutterheim emphasises the fact that this form of treatment is physiological and not physical; the voluntary element necessary for "exercises" is absent. He also discusses the equipment necessary for examination and treatment and his records show that good results are mostly achieved by 24 daily treatments of 10 minutes each, some seven tests with prisms being performed in the course of each treatment.

The book is worth reading for its content of practical information on a subject that often fails to awaken the interest of practising ophthalmologists. It seems from the author's dramatic results that this treatment is well worth trying in these difficult cases. A summary of the book is supplied in five languages with a survey of the results set out in a tabulated form, and clinical notes of typical cases.

Quarterly Journal of Medicine

THE April issue contains the following papers:—

A PRELIMINARY REPORT ON THE VALUE OF STOCK VACCINE IN THE TREATMENT OF PNEUMONIA. By J. H. Bolton (Royal Melbourne Hospital, Australia). The vaccine contained Types I, II, and III, and one of the Group IV pneumococci, a streptococcus, and *Micrococcus catarrhalis*, in equal numbers, and 600 million organisms were given, within 3 days of onset, to 32 cases of primary lobar or broncho-pneumonia. Comparison was made with a control series of 136 cases. Perfect random sampling was not obtained, but statistical analysis of the results gives the conclusion that vaccine treatment appears to shorten the mean duration of uncomplicated pneumonia from 8·7 to 5·7 days (mean difference $3{\cdot}05 \pm 0{\cdot}85$ days); it does not affect the mortality.

HYPOGONADISM ASSOCIATED WITH INVASION OF THE MID-BRAIN AND HYPOTHALAMUS BY A PINEAL TUMOUR. By R. A. Cleghorn, H. H. Hyland, J. R. F. Mills, and E. A. Linell (Toronto General Hospital). After a full clinical and pathological description of the case, and an extensive discussion of mechanisms, the authors conclude that the tumour disturbed the nerve-supply of the pituitary, causing an excessive secretion of luteinising hormone and a defective secretion of gonadotropic (and possibly also of thyrotropic and adrenotropic) factors.

MYELOMATOSIS. By Alice Stewart, in collaboration with F. Parkes Weber (Royal Free Hospital, London). Three cases of the plasma cell type and one of the rare lymphocyte type are described. All showed raised blood calcium without lowering of inorganic phosphorus. One had a macrocytic anæmia. Another showed hyperproteinæmia with failure of clot retraction, autohæmagglutination, and excessive rouleau formation. A third had a generalised tumour-like amyloidosis.

SOME OBSERVATIONS ON THE LÆVULOSE-TOLERANCE TEST. By C. P. Stewart, Harold Scarborough, and J. N. Davidson (Royal Infirmary, Edinburgh). Blood lævulose is estimated at half-hourly intervals for two hours after the ingestion of 50 grammes of lævulose. Normally it does not exceed 20 mg. per 100 c.cm. at 1 hour, or 8 mg. per 100 c.cm. at 2 hours. Observations on 130 cases indicate an increased usefulness for the test in this refined form. Diabetes does not interfere with it; arterio-sclerosis does.

TUBERCULOUS SPLENOMEGALY WITH MILIARY TUBERCULOSIS OF THE LUNGS. By R. A. Hickling (Charing Cross Hospital, London). Two cases are reported. In both the lungs showed the radiological appearances of miliary tuberculosis. In both the patients recovered normal health soon after splenectomy. In both many enlarged abdominal glands were present, and the excised spleen showed the histological appearances of tuberculosis without caseation; in one spleen, tubercle bacilli were demonstrated by staining methods.

INSULIN ANTAGONISM. By Alexander Glen and James Caithness Eaton (Victoria Infirmary, Glasgow). A diabetic woman, who had had the uterus and one ovary removed, became increasingly resistant to insulin, and eventually received 1050 units daily for a fortnight without showing diminution of glycosuria, on a diet containing 100 grammes carbohydrate. Acetonuria was absent, but appeared when insulin was withheld. When insulin injection was accompanied by intravenous infusion of phosphate solution, or by injection of 10,000 units of dihydroxyœstrin, some lowering of blood-sugar occurred. Injection of the patient's serum into rabbits diminished their hypoglycæmic response to intravenous insulin. The authors suggest that it contained an insulin-antagonistic substance, probably of pituitary origin.

EXOPHTHALMIC OPHTHALMOPLEGIA. By W. Russell Brain (with a pathological report on the ocular muscles and thyroid glands by Hubert M. Turnbull). A review of the clinical features and relationships of this condition, based on a study of 31 cases. The ophthalmoplegia is attributed to the mechanical effect of a raised retro-ocular tension on the extrinsic muscles of the eyeball. The same rise of tension contributes to the exophthalmos; exophthalmos, with histological changes in the orbit similar to those found in the author's cases, has been produced experimentally in thyroidectomised guinea-pigs by administration of pituitary thyrotropic hormone.

FAMILIAL IDIOPATHIC METHÆMOGLOBINÆMIA. By E. H. Bensley, L. J. Rhea, and E. S. Mills (Montreal General Hospital). Symptomless cyanosis dating from childhood was found in a brother and a sister; it was due to methæmoglobin carried in the red cells (0·7 and 1·6 g. per 100 c.cm. blood). Poisons and excessive absorption of nitrites from the gut were excluded. Five cases of idiopathic methæmoglobinæmia have previously been reported, one of which had a suggestive family history.

THE LANCET

LONDON: SATURDAY, MAY 28, 1938

THE TEACHING UNIT IN FACT AND FANCY

Dr. L. J. WITTS, leaving for the new Nuffield professorship in Oxford, after three years' tenure of the chair of medicine at St. Bartholomew's, contributes a valediction to the *St. Bartholomew's Hospital Journal* for May. It is neither an apology for his early departure nor a sentimental farewell, but a critical appraisal of the medical unit as he has found it, with a few pungent remarks on research in general. While the unit at Bart.'s has been, by general assent, one of the most successful of the full-time teaching units in London, Prof. WITTS's comments may be taken to apply in large measure to the others as well. He gives the units a threefold function: to care for the patients entrusted to them, to teach medical students, and to contribute to medical research, and he allows no greater importance to any one of those tasks than to another. In point of fact, he judges that the units have fulfilled the first two of those three conspicuously well; they have raised the standard of investigation and treatment of the sick and improved the education of students both directly in their own wards and indirectly throughout the hospitals to which they are attached. On that ground he defends their achievement against the general charge of "failure" which is still often brought against them. They have failed if at all in only one of their three functions, in that as a whole they have not produced much outstanding original work. The reason for that has become abundantly clear to Prof. WITTS in the last three years. The director of a unit who looks after his patients thoroughly, who teaches his students well, who "runs" an active department and gives help and training to his assistants, and who at the same time does a fair share of the committee and administrative work of his hospital, of the university, and of other medical bodies, simply has not the time or the energy or the peace of mind to carry out first-class original work himself. His whole task is vastly greater than that of a university professor in a chair of natural science, and he lacks even the temporal relief of university vacations. What is true of the professor applies in considerable measure to his deputy and his assistants; patients and students properly looked after take up so much time that what remains is too scanty, too much broken up, too inelastic to allow full scope to an original mind.

This appraisal of the medical units comes from one who knows them from inside, but who, not having been identified with them throughout his career, preserves some detachment. It seems to us to ring true. If true, it should give thought to those in whose hands the future development of the units lies. If it be granted that a unit should care for patients, and teach, and do both those things as well as they can be done, then the problem of clinical research can be dealt with in one of two ways. It can be relegated to special and independent departments, relieving the teaching units of all obligation in that direction. Such purely research departments already exist and have done excellent work. The major objection to that plan is that teaching, if taken out of the atmosphere of investigation, degenerates and becomes rigid and automatic; it turns out a competent enough doctor, well drilled in his craft, who ceases to learn any more after his first year or two of practice, and at fifty is the despair of every consultant whom he comes in contact with. The minor objection is that the isolated and specialised research institute, losing contact with general medicine, becomes a little narrow in its outlook, even a little intolerant, unwilling to accept good work that is outside its own experience. These objections can be met only by a system that allows teaching and research to go on side by side, each reacting on the other. That is not to say that they should both be done in equal parts by every member of a unit staff. It is so abundantly clear that one man can be a sound clinician and a good teacher, yet lack the inventive thoughtfulness or the mental precision necessary for good research, while another can be so alive with ideas and keen to put them to the proper test that he is impatient of the routine of treating the sick and teaching the young. The second alternative before the units is to provide within one department work and scope and salary for both those types of man. Both are extraordinarily useful members of the medical faculty, and neither should be accorded, from the nature of his task, greater prestige than the other. Both will develop in a more balanced fashion and will do their jobs better by virtue of the common atmosphere which they make and share. Young men will grow up in the department and find that their bent lies on one side of it or on the other; some of them may even alternate. More senior members of it should acquire considerable freedom to develop their own divisions as they see fit, and its chief should take counsel with them touching its general policy. His peculiar function is to choose his men well, fit them to the work that will train them best and get the best out of them, and hold the balance among them—a function that calls for a much more subtle administrative skill than that of the vigorous dictator.

Most students to-day receive their clinical teaching in medicine from honorary staffs and registrars, among whose qualifications for appointment a gift for teaching or an interest in teaching is not a first consideration. It is often suggested that for the student teaching is of secondary importance beside the first-hand experience of patients acquired in the wards. But that is not so. The example and the ideals of the teacher cannot fail to impress themselves; his enthusiasm, his

knowledge, and his technique all enable the student to make much greater use of his ward experience than he could do unaided. The more complicated medicine becomes the more important are its teaching and its teachers, and a few nurseries where first-class teachers can be grown will do more for future generations of students than a parliament of curriculum committees. The balanced unit that we have hinted at should also develop a research worker with his feet on the ground, free from that attitude, held up to scorn by Prof. WITTS, which spells Research with a capital R and invests it with an odour of sanctity. Such a unit, of course, will require much more finance and equipment than any of the present units has at its disposal, but it is the natural development of an experiment which up till now has proved largely successful. The case for increasing the present active units to an optimum size is a strong one, and, if what we have said of the value of the unit in medical education is even approximately true, the case for establishing the unit system in all teaching hospitals is even stronger.

EFFECT OF THE NEW C.M.B. RULES

THE Midwives Act of 1936 is working smoothly. Nearly 2000 domiciliary midwives have now been appointed by local authorities as their direct full-time employees, in addition to the 4500 employed by voluntary associations under arrangement with these authorities. The status and remuneration of practising midwives being now on a par with those of health visitors, the Central Midwives Board has felt justified in imposing a far more exacting course of training on women who propose in the future to practise as midwives. For the last five years a scheme has been in preparation and the Board's new rules for the training of pupil midwives, approved by the Minister of Health a year ago, come into force this summer. By a stroke of the pen the period of training is doubled for both classes of pupil: it rises from six to twelve months for those who have had a general training in nursing and are State-registered; from twelve to twenty-four months for those who have not. For the latter the change has already taken place; for nurses the new régime begins on Sept. 2nd. This course of training is divided into two, a first part lasting six months for general trained nurses and eighteen months for others, a second period lasting six months for everyone. The examination to be taken on completion of the first period of training will be similar to the present examination, the passing of which entitles the candidate to have her name entered on the Midwives Roll. But in future the passing of the first examination will entitle the woman who is not a nurse to nothing except the right to enter on the second part of training. The trained nurse will receive a certificate from the Board which it is intended should be regarded as proof of the adequacy of her training in midwifery for all higher nursing appointments unless she is to be engaged as a midwife. The Minister of Health has accepted this Part I certificate as sufficient training in midwifery for a health visitor; hospital authorities are expected to follow suit and to regard it as sufficient for administrative posts and for charge of surgical wards even if midwifery cases are occasionally admitted. Under the 1936 Act any general trained nurse can act as a maternity nurse, and the possession of a Part I certificate confers no rights on the holder which she does not possess as a State-registered nurse. It does, however, prove that she has had a training in midwifery adequate for all purposes other than the acceptance of personal responsibility for the management of a confinement. This division of the course into two periods and the limitation of the second part to women who are intending to practise as midwives will go far to solve the problem of providing a sufficient number and variety of cases for prospective midwives and medical students.

The object then of the first period of training is to make the pupil-midwife familiar with the best methods of practice and to provide her with a sound theoretical and practical knowledge of midwifery. During this period she will have to deliver personally only 10 cases of labour, instead of 20 under the existing rules, and will not be required to undertake any domiciliary work. With a few exceptions dictated by geographical considerations this part of the training will be conducted at maternity institutions dealing with a large number and variety of cases. During the second period the pupil will be treated as a senior apprentice who, having already received a grounding in her chosen craft, is widening her experience, improving her judgment, and increasing her self-confidence and capacity to assume responsibility before she goes out as a practitioner. In the six months she will be required (for the present) to deliver at least 20 women in labour—bringing the number up to 30 altogether, to have been responsible for the nursing of 60 lying-in women and their babies (40 if she is a trained nurse), to have made at least 50 complete antenatal examinations, and had the care of 20 or more pregnant women. This will now be the minimum equipment of the midwife who is legally entitled to deal on her own responsibility with normal cases but must still summon medical help in face of any illness or abnormality during pregnancy, labour, or the lying-in. Its very completeness will serve to confirm the doubts in many minds whether the instruction of medical students in obstetrics is not often less complete.

Be that as it may, for many years there has been increasing difficulty in obtaining sufficient material, particularly on the district, for the instruction of medical students in obstetrics, and the shortage has been partly attributable to the fact that cases which otherwise would have been available for medical students were being used for the training of pupil-midwives. When the new rules of the C.M.B. come into force this cannot happen; no case which is needed for medical students will go to pupil-midwives. It will be during the second period that a pupil-midwife will do the greater part of her practical work, and will receive the whole of her district training; for the most part the institutions approved for this period are

situated in areas away from medical schools. In the one or two cases where an institution approved for the second period is near a medical school, arrangements have been made that no district case will be used for the training of pupil-midwives within a certain radius of the medical school. Apart from a few institutions in the provinces where there is admittedly a surplus no medical school has been approved for either period of the midwife's training. Of the eight medical schools in London which train pupil-midwives at the present time, four will cease to train pupils when the new rules come into force; three have arranged with non-teaching hospitals joint schemes for the conduct of the first period of training—they will continue to take part in the training of midwives but will not allot a single delivery to a pupil-midwife. There will be an interchange between the two coöperating institutions, so that the pupils will spend three months at each. All cases of labour which the pupil is required to deliver will be attended at the associated hospital and not at the medical school. Guy's pupils for instance will have their cases at the Royal Northern, Middlesex pupils at Walthamstow, University College pupils at Battersea.

BLOOD-GROUP EXCLUSION OF PATERNITY

ON May 16th, for the first time in this country, a bench of magistrates dismissed an application under the Bastardy Acts on evidence of an exclusion of paternity by a blood-group test. The Wiltshire county magistrates, sitting at Marlborough on April 4th, spent several hours hearing conflicting evidence on an application by a domestic servant for an affiliation order against a young gardener. At the end of the day the solicitor appearing for the man asked the bench, as they were still not satisfied of the truth, to allow a blood test to be done. It will be remembered that the four Landsteiner blood groups now designated A, B, AB, and O were extended in 1928 by the discovery of two new agglutinogens M and N which define three types of blood—M, N, and MN. These types occur independently of the agglutinogens A and B. It has been amply proved that neither M nor N can appear in the blood of a child unless present in the blood of one or both parents; also that a type M parent cannot have a type N child, nor an N parent an M child whatever the type of the other parent. The applicant's solicitor agreed to the test and in due course the parties presented themselves with the child at St. Mary's Hospital, where Dr. G. Roche Lynch took blood samples.

Last week, when the case came up again, Dr. Roche Lynch said in evidence that the girl's blood group was AMN, the child's was AN, and the man's was OM. The A and O factors did not exclude paternity in this case, for the child could have inherited the A factor from its mother. But since the mating of parents of types MN and M could not have produced a child of type N, the father of this child must have been MN or N; the respondent was M. Dr. Roche Lynch handed the bench copies of a table of exclusions on the basis of the MN factors, and demonstrated how the test excluded the respondent. He admitted a human error to be possible, but stated that he had done the test personally with the coöperation of Dr. David Harley and was satisfied that he had not made a mistake. In answer to the applicant's solicitor, he said that blood-group tests, though widely used abroad for this purpose, were rarely done in this country. The solicitor for the applicant said that he proposed to accept without question the evidence that had been given. Sir Francis Burdett, the chairman of the bench, expressed his confidence that the exclusion cleared up the case and that there could be no miscarriage of justice. Dr. Roche Lynch, commenting on the value of such a conclusive test, expressed the hope that it would come into more general use in this country. The bench, though dismissing the application, decided that the applicant had had reasonable grounds for making it and therefore ought not to have costs awarded against her. The man had in any event assumed responsibility for the cost of the test.

This interesting case shows the progress which has been made in familiarising magistrates with the facts about blood-group evidence. It is significant that both the bench and the applicant's solicitor accepted the result of the test, backed by Dr. Roche Lynch's authority, without any further inquiry into its scientific basis. One reason why the test has been so little used in this country is that in the present state of the law it can only be carried out by consent. As the mother cannot benefit in any event by the result, her consent is not likely to be given if she has a substantial hope of succeeding on the other evidence. The test is not likely to be fully used until the law is altered to give magistrates discretion to order it as a condition of continuing to hear the application. Moreover, there must be some provision for paying at least part of the cost out of the public funds, for very few respondents in these cases could well afford the full cost, which would probably be between £3 and £5. The power would be essentially one to hold in reserve for difficult cases, especially as it will only exclude a proportion—about one in three—of innocent defendants. If used with discretion, however, it would be a valuable guide in many cases which at present are decided on doubtful evidence.

NATIONAL EMERGENCY INQUIRY

THE supplement to the *British Medical Journal* of May 21st gives some information about the response to the national emergency inquiry form, issued by the British Medical Association at the request of the Committee of Imperial Defence. Forms were issued to 43,560 practitioners, and the number who replied, plus the number who were not asked to complete the inquiry forms because they were already liable for service with the Territorial Army or the R.N.V.R., &c., represents a percentage of 76·19. Practitioners who stated that they were not prepared for health or other reasons to offer their services in any capacity numbered 3868, of whom 2081 were over 65 years of age.

ANNOTATIONS

CHEMOTHERAPY FOR PNEUMOCOCCAL INFECTION

AMONG the numerous bacteria on which sulphanilamide is known to act, the pneumococcus occupies a distinct but subsidiary place. An action there is, but it is not of the same order as the action on streptococci. The evidence of it is mainly experimental, and the mere fact that there are comparatively few clinical reports on the treatment of pneumococcal infections with sulphanilamide suggests that striking therapeutic results have not often been obtained. There is no reason inherent in the nature of the pneumococcus itself why it should not be fully susceptible to chemotherapeutic measures if the right compound can be found among the numerous substances related to sulphanilamide which are now being synthesised. From evidence furnished by Dr. L. E. H. Whitby (p. 1210) it appears that such a compound has been found, and the fact that it bears the number 693 is an indication of the immense chemical field now being explored.

The substance concerned is 2-(*p*-aminobenzenesulphonamido) pyridine, and the ascertained facts are that it protects mice against large multiples of the minimum lethal dose of pneumococci, is emphatically superior in this action to sulphanilamide, and as far as results in animals are concerned, is more than sufficiently non-toxic. It also acts against experimental streptococcal infection, an exceedingly small dose being effective. Among six types of pneumococcus tested, I, VII, and VIII were the most susceptible, II, III, and V rather less so: in this respect the action of sulphanilamide is reversed, since the latter is undoubtedly more efficacious for Type III infections than Type I. There is so far no clinical evidence in confirmation of these interesting findings, but this drug will doubtless be given a trial in the clinical field, and although pneumonia occurs first to the mind as a disease in which to apply it, perhaps a still more suitable one, and certainly a more severe and critical test, would be pneumococcal meningitis. Nothing in the astonishing therapeutic achievements of the past three years has carried more conviction than the power of sulphanilamide to arrest streptococcal meningitis. If this new drug can equal this achievement in its own sphere, it will have proved its worth.

Meanwhile much remains to be done in studying it, and undue optimism may prove to be misplaced. In the review of this subject which appeared in our two last issues Prof. L. P. Garrod pointed out that sulphanilamide is the only one of these drugs which has so far been fully studied from all necessary points of view. The advent of a new compound such as this demands in the first place a tedious but fundamental study on purely pharmacological lines: the optimum concentration in the blood must be ascertained, and enough must be known about absorption and excretion for defining a scheme of dosage that will maintain this concentration. The relative insolubility of this compound—only one-tenth of that of sulphanilamide—suggests that absorption of large doses may be a difficulty and other routes of administration may have to be considered. It may or may not appear rapidly and in adequate concentration in the cerebrospinal fluid when given by the mouth; if not, it will be necessary to know whether intrathecal injection is safe. Only clinical trial will show whether it has any toxic peculiarities, since none of the many toxic effects of sulphanilamide was foretold by animal test. All these things will need to be done, not only for this compound but doubtless for others that will follow it. There is indeed much work awaiting those with the capacity and facilities for therapeutic trial of these remedies.

RADIOTHERAPY OF BRAIN TUMOURS

As judged by the results of operations, slightly less than half of all intracranial tumours may be considered benign, and in about half of these the patients afterwards lead a useful life. At a meeting of the Society of Radiotherapists on May 20th Mr. D. W. C. Northfield pointed out that benign tumours comprise not only such encapsulated ones as meningioma and acoustic neurinoma, but also certain slowly growing gliomas. The astrocytoma of the cerebellum seen in children is entirely benign and provides some of the best results of neurological surgery. Such gliomas as the spongioblastoma multiforme and the medulloblastoma are on the other hand intensely malignant, and it is most often in these hopeless cases that the neurosurgeon turns to the radiotherapist for aid. Other tumours again may be considered malignant because of their position in the brain, though histologically they are fairly benign. These include diffuse astrocytoma of the pons, of the speech centres, and of the basal ganglia; in such situations surgical extirpation is not feasible. Irradiation also proves helpful in cases of pituitary adenomas, pinealomas and arteriovenous malformations. In speaking of the choice of case for radiotherapy, and the possibility of avoiding an operation, Mr. Northfield referred to the difficulty of being certain of the diagnosis. As a rule, he said, it is advisable to precede irradiation by an operation so as to avoid the risk of leaving a benign tumour, to relieve the distressing symptoms and sequelæ of increased intracranial pressure, and to secure a histological diagnosis. Occasionally fragments of tumour sufficient for microscopical examination can be removed in the bore of a hollow needle, introduced into the suspected region of the brain through a suitably placed burr-hole, but this carries a risk of rapidly fatal hæmorrhage into the tumour. In other cases the nature of the lesion may be indicated by radiography or by angiography.

Continuing the discussion, Mrs. E. L. G. Hilton laid emphasis on the long course and spontaneous fluctuations sometimes observed with brain tumours—characteristics that make it hard to assess the value of irradiation. Although an operation, even if limited to a decompression and biopsy, may obscure the effect of radiotherapy, it provides valuable information as to the position of the tumour and its histological nature. Upon the latter Mrs. Hilton formulates her radiotherapeutic technique, which she varies according to the pathological diagnosis. A method of ensuring that the correct region of the brain is irradiated was described by the next speaker, Dr. Robert McWhirter. The location and the estimated area of the tumour are indicated diagrammatically by the neurosurgeon on radiograms of the skull in two planes, often on the ventriculograms, and with this to guide him, he makes a chart of the portals of entry and the directions of the exposures. In order to prevent unpleasant reactions that may arise when radiotherapy is begun, the initial doses are much smaller than subsequent ones. Both Mrs. Hilton and Dr. McWhirter, and those who joined in

the discussion, were optimistic about the results of radiotherapy. Amelioration of general symptoms and improvement in the neurological status were adopted as criteria. The numbers of cases were too small for statistical survey, but all agreed about the radiosensitivity of such gliomas as medulloblastoma, spongioblastoma multiforme, and certain types of astrocytoma. A few cases of inoperable meningioma had also proved surprisingly responsive. Pituitary adenomas of both eosinophilic and chromophobe varieties had been treated with substantial success, as judged by the relief of headaches and improvement in vision and in certain of the associated endocrine disturbances. Cases of acromegaly were quoted in which this improvement had affected even the face and the extremities, so that the patients had had to be fitted with new dentures, and were enabled to wear smaller shoes.

A note of warning was sounded by Dr. McWhirter concerning the susceptibility of healthy brain tissue to irradiation. In two patients who had eventually died, post-mortem examination revealed softening of the white matter in areas of the brain in the line of treatment. Mr. J. E. A. O'Connell related similar experiences, and it is clear that this may be a limiting factor of treatment, especially in view of the present tendency to increase the dose of irradiation. The radiotherapy of brain tumours has not in fact advanced so far as radiotherapy elsewhere, and although histological proof is available that irradiation adversely affects gliomas, and the relative effects on the individual elements of the tissues composing the tumour have been analysed, many problems remain unsolved. Thus, with the medulloblastoma, there is evidence that the amount of damage resulting from irradiation is not directly proportional to the dose. Nor is there any explanation why individual tumours of similar histology, such as different examples of spongioblastoma multiforme, should show unequal response to treatment. Moreover, although irradiation may cause retrogression of a brain tumour, the ultimate goal is permanent cure. But if, with our present meagre knowledge and empirical methods, a portion of a tumour can be destroyed, there is surely reason to think that a technique will ultimately be evolved that will cause complete dissolution of the tumour. To encourage research an adequate number of beds should be allocated to the radiotherapist, and this is becoming increasingly urgent, since the courses of treatment now being practised in many clinics may last as long as eight weeks.

INFLUENCE OF DIGITALIS ON ANGINA

DIGITALIS is not called for in angina of effort, and when given it sometimes seems to have an adverse effect. Since the heart is not dilated in this condition one cannot expect digitalis to increase the contractile power of the myocardium, which indeed is usually unimpaired. The drug might, however, alter the coronary flow either by a direct action on the vessel wall, or by an alteration in the muscle tone, which is known to influence the coronary flow in perfusion experiments. Some experiments have made it look as though digitalis constricts the coronary arteries, but a possible source of confusion here is the functional condition of the heart, the effect differing according to whether the heart is dilated or not. Clinically, though it is notoriously difficult to assess the value of drugs on the course of angina, Gold and his colleagues [1] have tried to determine the action of digitalis in an experiment on 120 patients with effort angina and no congestion. The observations lasted a long time, for alternate periods of treatment with digitalis and with a placebo covered many weeks, or even months; likewise the dose of digitalis used was adequate, for this was gradually increased to 9 grains of dried leaf daily, unless toxic symptoms appeared. Full precautions were taken to prevent the patient knowing what drug he was taking, and if a single course of digitalis had an apparent influence on the pain a second or repeated courses were given later, the colour and taste of the preparation being changed. In 30 per cent. of the patients the pain seemed to be lessened in frequency or severity by digitalis; in 15 per cent. it was increased. These alterations, however, were not uniform in the same patient when the test was repeated, and similar results were noted from the use of a placebo. So far as these tests go, therefore, it appears that digitalis is without effect, either good or bad, on angina of effort.

[1] Gold, H., Otto, H., Kwit, W. T., and Satchwell, H., *J. Amer. med. Ass.* March 19th, 1938, p. 859.

NEW TESTS OF SCIENTIFIC TRUTH

IT was formerly believed that science knew no barriers. The pursuit of truth was along an international highway that crossed all national frontiers, and the traveller needed neither passport nor visa. Each country appreciated the characteristic contributions of the others and all new facts were welcome, whatever their origin, provided only that they enlarged man's knowledge of himself and the world around him. But times have changed, and we are faced with a new criterion of truth—namely, usefulness to a political régime. In raising economic barriers and other aids to self-sufficiency nationalism has now raised cultural barriers also. Hence we have become familiar again with the purging of libraries, and with bonfires of books; and we must not be surprised that the *Münchener medizinische Wochenschrift* should give pride of place to a paper [1] proposing to get rid of those parts of psychopathology that have been contributed by Jews. The author, Dr. Karl Hannemann, surveys the contributions of Germans and others to this latest, though most antique, branch of medicine; but he does so with the object of exalting the Nordic view of the world and consequently the Nordic view of what right-mindedness should be. Inasmuch as Germans are now taught that their misfortunes have been caused by aliens in their midst, and that the Nordic outlook is essentially right, it becomes natural that all influences not of their own racial origin must be defective and misleading. In the rebuilding of Germany the Nordic men of science have been coöpted by the political machine to cultivate a Weltanschauung which, in Hannemann's own words, "shall be taught in the universities because of and for the lasting maintenance of the new soldierly discipline of our people." Analytical psychology of all kinds, Freudian, Adlerian, and Jungian, is subversive of this national aim. As analysis it destroys the soul without discovering it. The Jews in particular, Freud and Adler, give to psychotherapy a Jewish slant; they poison first in order to depoison in their fashion. Jung, too, corrupts the youthful spirit of Germany, for although he rightly contemplates the racial differences of the unconscious, he has introduced an oriental mystical occultism. The Jews remain the great enemies of German psychotherapy. What is right in Freud is derived from the Nordics; what is false in his views (according to Prinzhorn and Bumke) is the result of the

[1] Hannemann, K., *Münch. med. Wschr.* May 6th, 1938, p. 657.

Talmudic dialectic. We look forward with interest, though with some concern, to the International Congress of Psychotherapy when some of our German colleagues will meet us in the serener air of Oxford.

Dr. Eduard Pernkopf, kommissarischer Dekan of the faculty of medicine, in the first anatomical address [2] given at the University of Vienna since the Anschluss, also deprecates the alien influence which till lately dominated science in his country and wrapped it in speculative imaginings till it no longer bore the imprint of the character of the people. If it is once more to become "German" in the truest sense of the word the limits of understanding must be frankly admitted and science must "not only be true but also clear as a spring of pure knowledge." Under the new order of things so-called freedom will be impossible; indeed Dr. Pernkopf considered it would be undesirable, for science should develop according to an ordered plan and strive towards a definite goal. It is no longer, he said, to be a question of science for the sake of science—but science as part of life must be made to serve life, and as guardian of the race the doctor will hold an important place in the new ideology.

SECRET REMEDIES

WHEN any reform is demanded as urgently as in the report of the Select Committee on Patent Medicines in 1914, something really ought to be done about it. In the latest sixpenny monograph in the "Fact" series (19, Garrick-street, London, W.C.2) Prof. A. J. Clark of Edinburgh University takes up this task afresh. He sets out the scandalous shortcomings of the existing laws. As the 1914 report revealed, anybody in this country can procure a drug or make a mixture, whether potent or powerless, advertise it as a cure for any ailment, recommend it by bogus testimonials or by the facsimile signatures of fictitious physicians, and sell it under any name he chooses, on payment of a small stamp duty, for any price he can persuade a credulous public to pay. The obstacles are few. He cannot traffic in a scheduled poison or in any of the drugs within the Dangerous Drugs Acts. In 1917 Parliament singled out the treatment of venereal disease for exceptional restriction. Otherwise the field remains as wide as when the Select Committee surveyed it nearly 25 years ago. Indeed the position has probably become worse because the public, while remaining ignorant of therapeutic and dietetic values, has become more health-conscious and, having now acquired the benefits of elementary education, is more susceptible to the persuasion of advertisement by way of poster or newspaper. In the eighteenth century, says Prof. Clark, a bottle of oil could be advertised as a cure for scurvy, leprosy, and consumption. To-day the modern advertiser would declare it to be rich in all the vitamins and the elements essential for life and would limit his claims to a statement that it will alleviate all minor ailments. Not that there are no advertisements of remedies for major illnesses. In 1936 the Medical and Surgical Appliances (Advertisement) Bill proposed to prohibit the advertising of cures for blindness, Bright's disease, cancer, consumption, epilepsy, fits, and so on. Just as the 1914 report escaped due notice because of the preoccupation of the country with Armageddon, so the 1936 Bill was unlucky in coming up for second reading on a day when our legislators were distracted by the Grand National. The House of Commons was counted out and the chance was lost to abolish the exploitation of fear. The Government is perhaps the more complacent because it levies taxation on proprietary medicines. It is indeed in some degree an accomplice, since the medicine stamp duties give a kind of official recognition. It has shown commendable interest in the improvement of the national physique. One simple step in this direction would be the institution of some measure of control of secret remedies.

Three essential reforms were propounded by the 1914 Committee—first, the registration of manufacturers, proprietors, and importers of patent, secret, and proprietary remedies; secondly, the disclosure of the ingredients of these remedies with a full statement of the therapeutic claims made or to be made; and thirdly, the control of advertisements. Prof. Clark's little book most usefully shows the growing necessity for such measures as these. His reference to the recent draft of a Food and Drugs Bill as containing provisions which may check fraudulent advertisement of proprietary remedies is probably too optimistic. The Bill does little more than re-state old statutes. The Committee which produced it confessed that their task was not to frame ideal legislation but to reproduce existing laws with merely so much amendment as was likely to command general assent. The Bill thus reproduces the 1928 Act which (like the older Act of 1875) penalises the sale of food or drugs not of the nature, substance, or quality demanded. The Bill leaves untouched the exemption for a proprietary medicine if "supplied in response to a demand for medicine." The chief amendment proposed by the Bill is in a clause which hopes to check misleading advertisements by penalising false and misleading labels on the wrappers and containers of food and drugs and by treating the advertisements (which probably had more influence than the label in inducing the sale) as if they were labels. It must be realised that the Food and Drugs Bill, now being examined by a Parliamentary Committee, is not going to contain anything controversial. It is therefore not the appropriate vehicle for the reforms which are required in order to protect the public from the mischiefs of secret remedies. Those reforms are urgently necessary. Perhaps Prof. Clark's exposition will stimulate official action.

NASAL SINUSITIS AND MENTAL DISORDER

SOME psychiatrists think that focal infection plays a large part in causing and increasing mental illness. Dr. T. C. Graves contributed a paper to these columns some years ago [1] in which he claimed good results from non-specific shock therapy, and in a monograph [2] appearing soon afterwards he said that of 1000 cases of mental disorder no less than 818 showed evidence of nasal sinus infection. Dr. A. B. Smith and Dr. C. M. Ross, who have studied 818 unselected cases in a mental hospital, produce strikingly different findings.[3] There were 23 cases in which the sinuses could not be examined with X rays, but in which there was no reason to suspect sinus disease. Of the remaining 795 cases, 63 showed definite evidence of nasal sinusitis, but 624 could be definitely regarded as free from sinus disease, while in the other 108 the presence of nasal sinus disease was doubtful. Thus of the 795 cases 7·9 per cent. had definite sinusitis and in 13·6 per cent. the diagnosis was inconclusive. Smith and Ross hold it probable that 32 out of the 108 doubtful cases had

[2] *Wien. klin. Wschr.* May 20th, 1938, p. 545.

[1] *Lancet*, 1932, **2**, 57, 115.
[2] *J. ment. Sci.* 1932, **78**, 459.
[3] *Edinb. med. J.* May, 1938, p. 343.

sinusitis, and this would give a total figure of 11·9 per cent. in the entire series. The methods employed were similar to those used in the ear, nose, and throat department of the Edinburgh Royal Infirmary, and diagnosis rested on the presence of muco-pus or pus in the washout of a suspected sinus, or on radioscopic examination. It is concluded that nasal sinusitis has no real ætiological significance in any of the main groups of mental disease, except for the theoretical possibility of a sinus infection producing a toxic confusional state, and in fact no such case was encountered in the 818 examined. The highest proportional incidence was found in the manic-depressive group, and may, they say, be correlated with the lowered physical vitality so often seen in these cases. The opinion reached is that mental patients in general do not stand to gain by treatment directed towards their nasal accessory sinuses. Smith and Ross admit that these 818 showed more sinusitis than would be expected in 818 members of the general population, but this they think may perhaps be explained by neglect of nasal hygiene during mental illness and by the overcrowding of many mental hospitals.

DOCTOR TO DOCTOR

A LETTER about a patient, written confidentially by one doctor to another upon a question of diagnosis or treatment, ought to be as absolutely privileged as correspondence passing between solicitor and counsel about a client. It comes as a shock to find that such a letter was made public in the disciplinary atmosphere of a health insurance subcommittee's proceedings. The patient in the case had been struck in the back by a bicycle. He afterwards collapsed at his work and had to be taken home. He was seen by Dr. A, who was acting as deputy for his partner Dr. B, Dr. B being the man's panel doctor. Dr. A suggested that the patient should attend at the local infirmary. He gave him a sealed envelope addressed to the infirmary doctor. Inside the envelope was a letter which contained the following passage: "Do you think that this man is soft? simple? ill? I have been called to him twice lately and have never been satisfied that he has been really ill. . . . I personally think he is a bit soft and has no 'guts.' I shall be glad of your opinion." The envelope was never delivered. The patient was too ill to get out of bed next day, and he died nine days later. On the day of the funeral the widow opened the letter which was intended for the infirmary doctor. The matter came before the medical service subcommittee on her complaint and the letter was included in the subcommittee's report. At the subcommittee's inquiry Dr. B, who had attended the patient after he became very ill, stated that he did not think the accident had any bearing on the death; the man was of a neurotic type; death was due to heart failure which had developed in the last few days before he died. No complaint was made against Dr. B, but the subcommittee recommended that the Minister of Health should withhold a sum from Dr. B's remuneration because Dr. A, his deputy, had failed to exercise reasonable skill and care. When the subcommittee's report came before the Lancashire insurance committee last week, the chairman of the latter body protested against the inclusion of the private letter in the report.

It may be hoped that this protest will be vigorously sustained. Two practitioners, engaged in the treatment of a patient, must be allowed the frankest consultation. Of the details on which the allegation of default on the part of Dr. A was based, no information is at present available. In so far as the private letter forms part of them, it is no basis at all. Dr. A is presumably being censured not because he wrote a letter which was perfectly proper as between one doctor and another, but because the letter was opened by someone for whom it was never intended. Many communications must be made confidentially in the course of professional consultation which might, if subsequently disclosed to the parties or their relatives, sound harsh and unsympathetic. This must be true of professional practice in other fields besides medicine and surgery. The spoken word may run less risk of misunderstanding than the written word which remains on record. But speech is not always practicable. It is, of course, in the interests of the patients or clients that this professional privilege is essential, not in the interests of the practitioners.

TECHNIQUE OF WASSERMANN AND FLOCCULATION TESTS

A CLINICIAN asked to say what he knows about the Wassermann test for syphilis would probably say that it depends upon the fact that a syphilitic serum fixes complement in the presence of a suitable antigen and that sensitised red cells are used as the indicator of the presence of any unfixed complement. Of the details of the technique for carrying out the reaction he would probably confess to knowing very little, and of the many pitfalls which have to be avoided and of the intricate mechanism of the test almost nothing. Such ignorance matters little, provided the work of interpretation is entrusted to a reliable serologist whose reports can be understood by the clinician, and that the latter is able to collate the information received with the clinical condition of the patient. It has become important for practitioners to know something of the interpretation of quantitative tests, doubtful reactions, anticomplementary serum reactions, and, above all, of the spinal fluid findings, and unfortunately many of them ignore the significance of such things. Even the extent to which the Wassermann and flocculation tests give comparable results is a matter to which clinicians have given little attention. According to Dr. Harry Eagle, who has gone fully [1] into the physico-chemical basis of the two types of reaction, they involve the same phenomenon, namely, the combination of reagin-globulin with the lipoid particles of the antigen and the flocculation of the compound; the same reagin determines both complement fixation and precipitation. He does not explain how it is that one comes across sera which give a positive Wassermann reaction yet a negative flocculation test.

Not only practising physicians, but serologists will find Dr. Eagle's informed comments valuable, though they may turn to different sections of his work. The former will find in chapters VI, VII, and IX an account of the mechanism of the Wassermann and flocculation tests, and in chapters XVI to XXII opinions on their clinical evaluation which will lead to a revision of many of his preconceived ideas. The serologist will note the criticisms of the conclusions reached at the serological conferences held under the auspices of the League of Nations Health Organisation in 1923, 1928, and 1930, and Dr. Eagle's view that the outcome of two subsequent serological studies and conferences carried out under the auspices

[1] The Laboratory Diagnosis of Syphilis. By Harry Eagle, M.D., passed Assistant Surgeon, United States Public Health Service, Washington, D.C.; Lecturer in Medicine, Johns Hopkins University Medical School, Baltimore; formerly Assistant Professor of Bacteriology, University of Pennsylvania Medical School. London: Henry Kimpton. 1937. Pp. 440. 21s.

of the U.S. Public Health Service and the American Society of Clinical Pathologists (1934–35) was no happier. The Wassermann techniques employed in these studies yielded widely discrepant results and in only three of nine flocculation tests under investigation were the results reliable enough to warrant further trial.

It has long been known that even in the hands of experts the results obtained with all these tests vary widely. Dr. Eagle, having justified by comparative figures his contention that the diagnostic tests as now performed in many laboratories are inadequate, is not without constructive suggestions. One is the refinement of the tests, though he admits that their sensitivity can be little, if at all, increased beyond the level already attained—well over 95 per cent. positive reactions in untreated syphilitic patients—in some of the newer flocculation methods or in an ice-box Wassermann reaction with a highly sensitised antigen. Improvement could still be effected in the provision of a wider margin of safety in the preparation and adjustment of the reagents and in minimising the personal element of interpretation in reading the results. More important, however, is his plea for a more critical attitude on the part of the individual laboratory to the calibre of its own performance. In some laboratories "outmoded" procedures, such as water-bath fixation, are employed; in others poor results are obtained, even with an approved technique, owing to an insufficiently trained personnel. Dr. Eagle regards ice-box fixation as essential for the satisfactory performance of the Wassermann test; in this country most laboratories use the method, recommended in a report to the Medical Research Council in 1929 by E. J. Wyler,[2] of fixation for half an hour at room temperature followed by half an hour in the water-bath at 37° C.

A serological report on a patient with suspected syphilis, whether before, during, or after treatment may have such a profound effect on the health and happiness that questions of technique should not be left unsettled. Another conference to evaluate the newer modifications of the complement-fixation and flocculation tests is surely overdue. Methods will have to be discussed afresh, after an unbiased survey of recent advances; and the routine laboratories adopting the one recommended should at least have opportunity of checking their technique from time to time with that practised in a reliable control laboratory. Some would go further and maintain that laboratories where Wassermann and similar tests are performed should be subject to periodical inspection by an expert.

A DUAL RADIOLOGICAL FELLOWSHIP

AT its recent meeting in Belfast the British Association of Radiologists came to a decision that should do much to improve the status of radiologists. When the Association was founded four years ago foundation members were admitted to the fellowship by thesis, but it was not long before examinations were established, and the first of these was held last year. The next step was to recognise that radiology has two distinct branches—therapy and diagnosis—and it was originally proposed that candidates for the fellowship should take examinations in both subjects and reach an honours standard in one of them. This plan, however, has now been abandoned, and there will henceforth be separate examinations in radiotherapy and in radiodiagnosis, success in either of which will confer the title of fellow. Both examinations will include sections on medicine, surgery, and pathology, and it is hoped that bodies granting higher qualifications in these subjects will coöperate by appointing associate examiners. Candidates who already hold such higher qualifications will be exempt from the relevant part of the examination, but must possess a diploma in radiology and must present a thesis on some aspect of either diagnosis or therapy.

One beneficial effect of a special examination in radiotherapy should be to facilitate the choice by hospital authorities of medical officers competent to take charge of this department and to control the use of the radium provided by the Radium Commission. In their last report the Commission commented on the difficulty of obtaining well-trained radiotherapists, and made various suggestions for improvement in their status. It is now generally agreed that X ray and radium therapy cannot be divorced, and that a full knowledge of both, as well as of the physics of irradiation, is needed by those who undertake responsibility for the treatment of patients by such potent agents. But the most important side of the radiotherapist's work is clinical, and extensive experience, particularly in the treatment of malignant disease, is also essential if this work is to be done well. Such experience can be obtained only in special hospitals, or in large general ones where cases treated by these methods amount to many hundreds in a year. The radiotherapist of the future, after obtaining a diploma in radiology, will clearly have to embark on a course of training as exacting as that required for any other specialty. If he then passes an examination of a standard high enough to ensure theoretical as well as practical competence he will be entitled to a status equal to that of any member of the staff, though the nature of his work demands a full-time appointment on a salaried basis.

TROPIC OR TROPHIC?

SOME of those who read the note by Dr. van Wagenen and Dr. Morse appearing on p. 1220 will dismiss its opening word, *gonadotrophic*, as a printer's error. But they will be wrong; for the form that yesterday was only a commonplace spelling mistake bids fair to prevail to-morrow. In a book published last year Prof. Burn [1] contended that in endocrinological usage the termination *tropic* is less suitable than *trophic* and recommended that henceforth *gonadotrophic*, *thyrotrophic*, *adrenotrophic*, &c., should replace the current form. *Tropic* means "turning towards," whereas *trophic* means "nourishing"; and ultimately it must be left to biologists to decide which of these more accurately describes the action of a hormone. In favour of the change it is argued that the thyroid-stimulating hormone, for example, does not turn towards the thyroid any more than it turns towards all the other glands and tissues; but when, on its travels round the circulation, it reaches the thyroid it proceeds to nourish that particular gland in some way necessary to its growth—excess or deficiency of such nourishment making it *hypertrophic* or *hypotrophic*. The conception of a *thyrotropic* hormone is, moreover, inconsistent with the familiar conception of *geotropic* or *heliotropic* growth by plants; for it is the hormone that turns to the gland, not the gland to the hormone. Some oppose the alteration on the ground that better terms will have to be devised when more is known about these substances; but as an interim improvement it is

[2] *Spec. Rep. Ser. med. Res. Coun., Lond.* 1929, No. 129.

[1] Burn, J. H., Biological Standardisation, Oxford, 1937.

commended by Dr. Parkes[2] of the National Institute for Medical Research. He also proposes that *gynæcogenic* (rather than the specialised *œstrogenic*) should be used as a general term for activity that promotes the attributes of femaleness, and that *ambisexual* should be preferred to *bisexual* where activities pertain to both sexes.

TEETHING

THE disturbances associated with dentition in young children are still imperfectly understood. They have been made to cover a multitude of symptoms, and it is a grim jest at many children's hospitals that even cases of tuberculous meningitis are sent in with a diagnosis of "teething." The result is that most experienced pædiatricians are very reluctant to attribute ill health to dentition. Dr. Robert Paschke[3] nevertheless finds it hard to accept the current view that dentition is a physiological process and hence incapable of causing disease; it is unreasonable, he thinks, to insist on attributing teething troubles to rickets or a neuropathic tendency or "hypersensitivity." From dental experts he has ascertained that the final stages of the growth of the tooth necessitate a destruction, by the enlarging "crown," of the soft parts which lie between the tooth-sac and the gum margin. At the time when this stage is reached—some 8–21 days before the actual appearance of the tooth in the gum—a destructive necrosis takes place and the dying tissue is especially liable to secondary bacterial infection by organisms present in the mouth. Whether this infection materialises is, according to Paschke, a more or less chance affair, and does not depend on the state of health or on any underlying diathesis or tendency. He estimates that about 10 per cent. of all small children are affected by this "septic" complication, although he points out that medical aid is sought for in only half of them. In support of this hypothesis the symptoms due to teething are those that might be expected from the absorption of toxins from a septic focus—namely, fever, loss of appetite, restlessness, pain in the gums, various degrees of inflammation of the upper and often the lower respiratory tracts, otitis, and disturbances of the alimentary tract. Rashes about the face and ears are also common. In severe cases the child suffers from high fever, vomiting, and even convulsions, lying in bed with glassy eyes and all the signs of a severe systemic toxæmia, though remarkably little can be found to account for it, even on inspection of the mouth. The eventual appearance of the teeth through the gums, after an interval of 1–3 weeks, is as a rule quietly accomplished.

Paschke unrepentantly accepts a disorder which he names "tooth fever," and his views seem to have a background of solid fact.

INGENUITY IN EXCELSIS

EVERY year the Royal Society enlivens its conversazione with an exhibition of scientific mechanisms and marvels. Whatever effect this may have on the Society's own fellows it certainly makes for modesty in the visitor; for even the courteous explanations offered by the custodians are apt to leave him incompletely informed about (for example) order-disorder transformation in alloys, the shield grid thyratron tube, and the storage principle in the emitron. Last week it must have been a relief to many to turn at times to the superficially simpler objects—the collection of stuffed mammals illustrating prehensile tails, the well-preserved wooden piles that once supported Waterloo Bridge, and the fascinating bevy of echinoderms carried alive from Plymouth to join in the evening's fun. From the borderland of medicine Dr. F. Himmelweit and Mr. J. Smiles had brought an equally live and much more lively group of virus bodies visible at a high magnification in cells of the chorio-allantoic membrane of the chick, and Mr. J. E. Barnard, F.R.S., of the National Institute for Medical Research, showed apparatus in which ultra-violet energy of a single wave-length 253μ is used as an illuminant when material thought to contain viruses is examined microscopically. In the higher vegetable creation pots of plants were arrayed to illustrate how the colour of the garden hybrid, streptocarpus, depends on structural differences in the anthocyanin molecule inherited as simple mendelian factors. More immediately important perhaps were an apparatus for continuously recording gaseous exchange in expired air (designed by Prof. Rein of Göttingen and shown by Dr. A. Schott), a demonstration of the manufacture of cyclopropane and its application as an anæsthetic (Imperial Chemical Industries), and new means of sampling industrial dusts (Prof. H. V. A. Briscoe). Mr. G. W. C. Kaye, D.Sc., and Mr. J. E. R. Constable, Ph.D., of the National Physical Laboratory showed how the wave form and spectrum of sounds can be continuously observed, and the Cambridge Psychological Laboratory displayed tests devised for examining sensory thresholds and the effect of memory on performance. A film illustrating the growth of roots was shown by Prof. E. J. Salisbury, F.R.S.

SILICOSIS AS A BIOLOGICAL PROBLEM

THE problem of silicosis, like many others in which complex physical and chemical, as well as pathological factors are involved, becomes more perplexing the more it is studied from these several angles. There has been a tendency in recent years to use the difference in the solubility of silica and the silicate under experimental conditions as an argument supporting this or that theory of its ætiology, and this or that practice, in the attempts constantly being made to reduce its incidence. Mr. E. J. King, Ph.D., sets out briefly on another page what is known of the solubility of silica. A much more extensive survey of the physiological and pathological aspects of silica, contributed jointly by Dr. King and Dr. T. H. Belt, will shortly appear in *Physiological Reviews*.

A Select Committee of the House of Lords rejected on Tuesday the Bill promoted by the governors of St. Bartholomew's Hospital to secure power to use the general funds of the hospital for the provision of a paying patients' department.

To medical men in all countries the name of Prof. GEORGES MARINESCU was familiar for his contributions to neurology, and his death on May 15th, at the age of 75, removes a truly international figure. He was appointed to the Salpêtrière in Paris in 1889 and worked on epilepsy in Charcot's clinic. From there he went to Frankfurt as assistant to Weigert, and later to Berlin. Returning to Bucharest, to the chair of nervous diseases, he continued to investigate the histology of the nervous system, its degenerative diseases, and its physiology. His eminence as research worker and clinician led to the publication of a book on his life and work, to which contributions were made by neurologists of many countries, with a foreword by Ramon y Cajal.

[2] Parkes, A. S., Sc.D., F.R.S., *Nature*, Lond. 1938, **141**, 36.
[3] *Münch. med. Wschr.* 1938, **85**, 52.

SPECIAL ARTICLES

THE SOLUBILITY OF SILICA

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For several years the pathogenicity of silica in its relation to silicosis has been widely held to depend on its solubility. Older theories had envisaged a sort of microscopic trauma, due to the sharpness of the particles. But following the demonstration by Kettle (1932) that the coating with iron of powdered silica rendered it innocuous and the failure of Gardner (1923) to produce lung fibrosis with powdered carborundum, this so-called "mechanical theory" of silicosis was largely abandoned. A body of evidence has accumulated which seems to indicate that silica in solution has a poisonous action on the tissues (cf. Gye and Purdy 1922, Gye and Kettle 1922, Gye and Purdy 1924). If the toxic action of silica dusts be due to their solution, then the particles in a silicotic lung must dissolve—to some extent at least—in tissue fluids.

Sosman (1927) in his well-known monograph on silica and silicates has said that from the standpoint of the industrial chemist silica is about the last thing on earth which could be expected to be harmful in the body. Its inertness is a matter of common knowledge and in its crystalline forms, such as quartz, it is usually thought of as being one of the most highly insoluble of substances. This current belief in the insolubility of silica does not, however, stand the test of experiment. It is true that if water is kept in a quartz vessel no silica can be demonstrated to have passed into solution from the walls of the vessel, but if the quartz be reduced to a very fine powder and then suspended in water, the presence of significant amounts of silica in solution can be demonstrated.

Many of the older results recorded, which were claimed to indicate the solubility of quartz in water, are, it is true, of little value. They were obtained at a time when workers had no adequate means of separating the very finely divided particles of their quartz powder from the solution. The filtrates on which they determined solubility contained not only dissolved silica but suspended particulate matter. For this reason the early results on the solubility of silica (e.g., Struckmann 1855) do not provide a proper measure of the dissolved silica. Lehner and Merrill (1917) were aware of this difficulty, but did not have the means to overcome it in their solubility studies.

With the introduction of modern methods however any difficulties in the way of determining the solubility of silica and silicate dust have been removed. The ultra-centrifuge and the ultra-filter have made it possible to obtain true solutions completely separated from the suspended solid material (King and McGeorge 1938, Titus 1937) and the utilisation of chemical reactions, into which only the molecularly dispersed silicic acid will enter, has furnished a further means of measuring the true amount of the dissolved silica.

In water and biological fluids most of the reported figures for the solubility of quartz vary between 4 and 14 mg. SiO_2 per 100 c.cm. Several results from the work of recent investigators are set out below in tabular form. The considerable variation in the figures shown is probably due to the fact that the several authors have used dusts of different particle size, different concentrations of suspended solid, and perhaps different methods of separating the solid from the liquid phase in the estimation of the dissolved silica. Small amounts of impurities in the mineral dusts likewise influence the degree of solution. This factor is, of course, particularly important in solubility studies with distilled water. It is not so important in the case of biological fluids which already contain as known constituents appreciable amounts of the substances, such as calcium, which may influence to a marked extent solubility of quartz in distilled water.

SOLUBILITY VALUES FOR SILICA AND SILICATE DUSTS

	Mg. SiO_2/100 c.cm.	Liquid.
Amorphous silica ..	10·0	Water.[1]
" " ..	14·0	Pleural fluid.[1]
" " ..	9·0	Blood-serum.[4]
" " ..	9·1	Ascitic fluid.[4]
Quartz	4·3	Water.[1]
"	3·8	Water.[2]
"	2·7	Water.[3]
"	19·0	1% $NaHCO_3$.[5]
"	9·1	Ascitic fluid.[4]
"	8·9	Blood-serum.[4]
Flint	14·7	Water.[3]
"	6·5	Ascitic fluid.[4]
Granite	0·7	Water.[3]
"	5·0	1% $NaHCO_3$.[5]
Asbestos	11·2	Water.[3]
"	2·1	Water.[3]
Fuller's earth	1·4	Ascitic fluid.[4]
Kaolin	0·7	Water.[3]
	0·4	Ascitic fluid.[4]
Sericite	0·7	Water.[3]
"	0·8	Ascitic fluid.[4]
Talc	0·8	Ascitic fluid.[4]

[1] Archer (1932); [2] Briscoe et al. (1937); [3] Denny et al. (1937); [4] King and McGeorge (1938); [5] Whitehouse (1937).

SOLUBILITY-DEPRESSION PHENOMENA

The substances which affect the solubility of silica fall into two classes: (1) substances like coal which appear to depress solubility because they adsorb the dissolved silica, and (2) certain metals and their oxides. The latter are characteristically those which form insoluble silicates, and it is probable that the solubility-depression phenomenon is due simply to precipitation of the silicic acid, as fast as it appears in solution, as the insoluble silicate. This precipitation takes place most readily in the presence of an excess of the finely divided metal or metallic oxide.

The effect is particularly well seen with *lime*. Minute amounts of calcium hydroxide enhance the solubility of quartz, but large amounts almost completely depress it. Lime is not very soluble in water, but it is soluble enough to give a solution which is centinormal in alkalinity and has a *p*H of about 12. In this alkaline medium silicic acid is completely precipitated as calcium silicate, and hence silica shows almost no solubility in lime water. Calcium carbonate, being a much weaker alkali and much less soluble than calcium hydroxide, might be expected to have little if any depressing effect on silica solubility and this is indeed the case. Bubbling CO_2 into a lime water suspension of silica restores the solubility of the silica from almost nothing to very nearly the figure for silica solubility in water. The CO_2 has simply changed all the calcium hydroxide into carbonate, and precipitated a lot of it in the process.

That calcium carbonate may even increase the solubility of silica in water was shown many years ago by Dienert and Wandenbulche (1923) who found that the river waters of France which flowed through granite formations picked up much more silica in solution if they had previously flowed through a limestone area. More recently Denny et al. (1937)

have shown that the solubility of a very pure silica sand (99·6 per cent. SiO_2) could be increased from 3·8 to 12·3 parts per million by the inclusion of only 0·5 per cent. $CaCO_3$.

It would be rash to speculate on these solubility relationships of silica with limestone in connexion with the occurrence of silicosis in trades, such as cement manufacturing, which carry an exposure to both silica and lime dust. But it must be remembered that while silicosis has a lower incidence in the cement industry than in those having a hazard of purely siliceous dust, the popular notion that cement workers never get silicosis rests on no sure foundation. Not infrequently clinicians and pathologists encounter lungs of cement workers showing changes characteristic of silicosis and tuberculosis (cf. Belt 1929, Russell 1933). A large proportion of the dust in these lungs, and in the air breathed by the workers in cement factories is non-siliceous, and Sayers and Jones (1938) hold to the belief "that the absence of evidence of extensive pulmonary fibrosis among employees in the cement industry is due to the fact that there is insufficient total exposure to free silica (considering concentration of dust and duration of exposure) rather than that there is any neutralising effect due to the calcium."

Metallic *aluminium* is a particularly efficient depressor of silica solubility. By the inclusion of 1 per cent. of finely divided aluminium in their powdered quartz Denny et al. (1937) were able to reduce the solubility almost to nothing. Acting on the "silica solubility" theory of silicosis these workers exposed animals to an atmosphere containing quartz dust in one group and quartz dust with aluminium in another. In contrast with the fibrotic response observed in the silica group was the almost complete absence of any fibrosis in the lungs of the silica + aluminium group. Only a preliminary account of this work has so far appeared.

J. S. Haldane was for many years the leading exponent of stone dusting as a measure designed to decrease the silicosis hazard of highly siliceous dusts. For this purpose he advocated the use of powdered *shale*, a material which long experience had shown to be a non-dangerous dust. It was Dr. Haldane's belief that shale dust acted not merely as a diluent of the dangerous dust, but that it actually antagonised the effects in the lung of the free silica. The interesting experiments of Whitehouse (1938) on the effect of various stone dusts on the solubility of flint and quartz now demonstrate a distinctly depressing effect on silica solubility of finely powdered shale and gypsum. Many samples of different shales behaved similarly in exhibiting this phenomenon of a 40 to 60 per cent. depression of the solubility of quartz. A similar effect was shown with several coal dusts, and Whitehouse recalls in this connexion the repeated observation of Haldane that "silica dust is apparently rendered harmless if breathed with a sufficiency of certain inert dusts such as coal dust."

Last year attention was drawn to the possibility that freshly fractured minerals exhibit special properties due to their newly formed particle faces (Denny et al. 1937, Briscoe et al. 1937). The suggestion is that the rate at which silicic acid would dissolve from such particles would be greater than the rate in "stale" dusts which have been prepared for some time, and whose particle faces have lost their active properties. The finding of a higher solubility in freshly prepared dust led Denny, Robson, and Irwin (1937) to their experimental work on the production of nodular fibrosis in rabbits with freshly forming dusts (see *Lancet*, 1937, **2**, 271). Whether or not this fibrosis is a true silicosis has yet to be established.

EXCRETION OF SILICA

The solution of silica in the lungs should result in the passing of silicic acid into the blood, followed by its excretion in the urine. Several studies have been made in recent years of the silica excreted in the urine of miners and other people exposed to the inhalation of siliceous dusts. King and Dolan (1934) found the average silica excretion to be higher amongst a group of gold miners than in a normal mining population, and Bloomfield, Sayers, and Goldman (1935) claimed to show a relationship between the amounts of silica in the urine of miners and their silica dust exposures. Whitehouse (1937) described experiments in which he swallowed samples of powdered rock. Small increases in the silica excreted in his urine occurred after the taking of very finely powdered flint dust and of Scotch whinstone, a rock of mixed silicates. Other minerals gave negative results. With relatively much larger samples of mineral dusts King and McGeorge (1938) have shown that several other minerals are dissolved to an appreciable extent in the gut and are excreted in the urine of cats. They likewise studied the excretion of silica following the intraperitoneal injection of powdered minerals. An appreciable solution seemed to take place in the case of most of the forms of free silica (e.g., amorphous silica, quartz, flint). In the case of the combined forms of silica—the mineral silicates—only very small increases were observed.

It seems unlikely, on the basis of the data which have thus far appeared, that any useful results can be obtained from studying the excretion of silica in the urine of miners and other workers exposed to a dust hazard. It is probable that only a small proportion of the total silicate in the urine comes from the lungs. The silica of the diet readily causes variations in the urinary silica, and the food of industrial workers exposed to silica dust inhalation would have to be very rigidly controlled before any significant changes due to silica solution in the lungs could be looked for. More profitable may be the comparisons of solubilities in vitro and the excretion following the administration of massive doses to animals, with dusts constituting known industrial hazards. Recent results obtained by King and McGeorge (1938) indicate that the different varieties of free silica which, with the exception of asbestos, are the only well-authenticated cases of silicosis producing industrial dusts, are those which are most soluble in body fluids and which seem to suffer most solution in the body.

BIOLOGICAL FACTORS

But while it may be interesting to correlate the data of solubility studies with the known or supposed risks constituted by the inhaling of various mineral dusts, it must always be borne in mind that silica solubility is only one aspect of a very complex phenomenon. It would be idle to suppose that silicosis can be explained in any such simple terms as tissue reaction to a toxic substance furnished by the dissolving silica. The ætiology of the disease is so inadequately understood that no useful purpose can be served in trying to assess the importance of the various factors concerned in its production; save only to point out that there is a tendency at the present time to place so much stress on the physical aspects of the problem as to neglect the possibly more

important biological factors. In Kettle's words (1936) "By infective silicosis is meant the modification in a dusty lung of the reaction of a chronic low-grade infection, frequently tuberculosis, in the direction of increased fibrosis." It is possible that all human silicosis may be infective silicosis.

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BRITISH ASSOCIATION OF RADIOLOGISTS

THE fourth annual general meeting was held in Belfast on May 13th and 14th, at the Whitla Medical Institute. At the opening session Prof. J. WOODBURN MORISON, the outgoing president, introduced and installed Dr. R. MAITLAND BEATH as his successor. Dr. Beath then delivered his presidential address, dealing with the history, development, and activities of the Association, and its future aims.

Scientific Communications

Prof. P. FLEMMING MØLLER (Copenhagen), who was warmly welcomed by the chairman, read a paper on Chronic Fluorine Poisoning as seen from a radiological standpoint. He had investigated with his co-workers large numbers of cases of this form of poisoning as it occurs in workers exposed to cryolite dust, or who may have ingested fluorine in other forms. He showed slides illustrating the condition of the bones; the outstanding feature is a marked increase of density, not unlike the marble bones of Albers-Schönberg disease. The conditions should be easy to differentiate as in fluorine poisoning there was also deposition of calcium in the ligaments and muscular attachments, particularly well seen in the spine, where in advanced cases the picture resembled that of spondylitis ankylopoietica. These deposits of calcium also served to distinguish the condition from Paget's disease, and from hypertrophic secondary deposits such as may arise from carcinoma of the prostate. The clinical findings were also of importance. Silicosis was present in half the subjects examined, and nausea, lack of appetite, and vomiting were complained of, with drowsiness and constipation. The element fluorine was widely distributed in nature, and poisoning might result from its presence in the water-supply, or because animals fed on contaminated pastures; in Iceland following a recent eruption many of the sheep were affected. Milk could convey the fluorine, and one of the slighter manifestations, mottled teeth, was seen in children and young animals whose mothers suffered from chronic poisoning.—Dr. J. F. BRAILSFORD remarked on the extreme thoroughness with which this investigation had been carried out both on the clinical and experimental side.

Dr. PETER KERLEY read a paper on Syphilitic Aortitis and Aneurysm of the Aorta, illustrated by many radiograms of great interest. He pointed out that the difficulty of diagnosis might be considerable, particularly where the symptoms were those of cough and dyspnœa, without obvious changes referable to the heart. It was often taught that a tumour in the mediastinum associated with an apparently normal ascending aorta could not be an aneurysm, but in his experience the sign was unreliable, as he could show in two of his cases. Expansile pulsation, if this could be demonstrated, was diagnostic, but it was rarely seen, and transmitted pulsation could be very misleading. The lobulated tumour border associated with enlarged glands could be simulated by daughter aneurysms; finally pressure on a main bronchus with atelectasis and effusion might look exactly like a primary bronchial carcinoma.

Dr. T. GARRATT HARDMAN described A Position for Radiography of the Fourth Ventricle. It was very tempting to use Thorotrast but there was a real danger of collapse and death on the table, particularly if ventriculography was carried out at the end of an intensive operative interference. It might be of great importance to the surgeon to know whether the block in a case with hydrocephalus was above or below the tentorium. He had found the most useful position to be a true lateral one with the patient face downward with nose and forehead in contact with the cassette, as for a sinus radiogram.

Dr. BRAILSFORD discussed Brodie's Abscess and its Differential Diagnosis. The lesion was always a result of chronic infection, and he emphasised the practical importance of careful localisation because of the difficulty of finding a small cavity in the centre of the bone.

Dr. M. C. TOD read a paper by Dr. RALSTON PATERSON and herself on the Radium Treatment of Angiomata in Children. She said that angioma was a true neoplasm, and was radiosensitive, and claimed that the cosmetic results obtained made radiation the treatment of choice. Cauterisation with CO_2 snow produced scarring, and was only successful with very small lesions. The capillary angioma, or port-wine stain, did not respond well to radiation, but was equally difficult to treat by other methods. If radium treatment was carefully planned it was perfectly safe. The best time to treat was during infancy, although radium could be used at any age. The dose must be controlled, and homogeneous irradiation obtained by radium arranged on Elastoplast moulds or implanted in the tissues according to the rule of the Paterson-Parker dosage system. At Manchester, radon in silver seeds was used for convenience. A safe rule was that all reactions should be avoided, and the plan recommended was to give repeated applications of 1500 r delivered in 5–6 days, with intervals of two months. As a rule four treatments produced complete disappearance of the neoplasm, but six or seven such applications could be given with safety. It was not suggested that this was the only method of irradiating angiomata, but experience had shown that it could be confidently recommended as a safe and permanent form of therapy. A number of photographs were shown illustrating the results which could be obtained.

Dr. S. COCHRANE SHANKS described Four Area Methods of X Ray Treatment of Tinea Tonsurans.

THE COST OF A HOSPITAL

THE Departmental Committee of the Ministry of Health on the cost of hospitals have already issued an interim report [1] on "acute" general hospitals, and now publish a final report on hospitals of all other kinds (H.M. Stat. Office. Pp. 121. 2*s*.). They deal first with accommodation for maternity cases, sick children, and patients with chronic illness, and then with the other types of public buildings set out in their terms of reference: residential institutions for pulmonary tuberculosis, isolation hospitals, mental hospitals, mental deficiency colonies, public assistance institutions, and baths and wash-houses, including covered and open-air swimming-pools. They were directed to pay special attention to the establishment and periodic revision of standards, modern methods of construction, and the possibility of securing a reduction in present costs without impairing the efficiency of the buildings for the purposes for which they are designed. They have written throughout in terms of minimal or desirable accommodation for efficient service and the actual or relative cost entailed in adopting their recommendations is nowhere estimated in figures. It is left to the architect, the engineer, the quantity surveyor, and the rest to translate them into such specific terms as will enable those planning hospital extensions to judge of the cost these will entail.

THE MATERNITY DEPARTMENT

The committee framed their recommendations on a maternity department on the basis of one containing about sixty lying-in beds and forming part of a general hospital, but their plan can be easily modified for greater or smaller departments, thirty beds being the standard ward unit. They recommend separate accommodation for a few potentially septic cases, four observation beds, and ten antenatal beds. They regard eight beds as the maximum number for a ward and prefer wards of four beds, if they can be so planned as to provide good lighting and ventilation. They do not hold single-bed wards to be necessary throughout the department, but enough should be provided to facilitate classification and to allow a fair number of patients to be isolated. They recommend not less than six single-bed wards in each thirty-bed ward unit.

THE CHILDREN'S HOSPITAL

The special liability of children to infections and the need for practical measures to reduce the risk of their spread is emphasised. With thirty beds as a standard ward unit, small wards for six or even four patients and not less than six single-bed rooms in every unit are recommended. Infants under two should be nursed in single-bed rooms. Eighty square feet per bed is regarded as a satisfactory standard—considerably less than for an adult ward—but eight feet should be maintained between bed centres, to avoid cross-infections. Good lighting and ventilation and facilities for open-air treatment are particularly important in children's wards; open-air wards, verandahs and balconies, or large windows are essential. The ancillary room requirements are broadly the same in a children's as in an adults' ward unit, but more baths are required; a fixed bath in each single room preserves the advantages of isolation. Otherwise a changing-room is essential. A milk preparation room should be an annexe to the ward kitchen. Generous isolation accommodation should be provided.

[1] See *Lancet*, 1937, **1**, 521.

CHRONIC PATIENTS

The advantages of providing accommodation for cases of chronic sickness as part of a general hospital are that patients who require active medical treatment or some special form of investigation may easily obtain it; the difficulties of staffing inherent in an institution which provides only limited interest and experience are avoided; and the nurses of a general hospital can obtain useful experience with chronic patients. A large number of patients are, however, better accommodated in a special chronic hospital. In such a hospital, administration and equipment are simpler and the general activity is less. There is therefore no objection to larger units than the normal, provided that the sister in charge has adequate trained assistants. A ward unit may therefore contain up to sixty beds unless there is difficulty in obtaining trained staff nurses. The younger and more mentally alert patients should be separated from the large senile group and provided with suitable occupation and recreation. Physically offensive patients should also be segregated. Smaller wards must be provided in sufficient number to allow of proper classification. Six single-bed wards in a unit should be enough. A long ward may be partitioned into sections, though separate wards are preferable. The bed space may be less than in a general hospital. The committee think that the longitudinal arrangement of beds for chronic patients is worth trying. The subdivision by screens which it entails permits of classification, but interferes with supervision and may necessitate an increase in staff. Verandahs and balconies are useful to give some of the patients fresh air, and for continuous open-air treatment of certain types of chronic disease. A portable X ray apparatus is sufficient, and for this and for electrical treatment one or two power points should be provided in each ward. A reception department is generally not necessary, and less residential accommodation for the staff is required in a general hospital of the same size, for a larger proportion is usually non-resident.

TUBERCULOSIS

Hospitals for tuberculosis are tending to resemble general hospitals, and their design is subject to much variation; they may be erected in single- or double-story pavilions. The site should preferably be rural, but reasonably accessible. The ward unit should be from forty to fifty beds, according to the proportion of ambulant patients; there should be not more than six or even four beds in each ward, and provision of single-bed wards for 15 to 20 per cent. of the patients. For bedridden patients it is desirable to have an open terrace or balcony; for ambulant patients wide windows are sufficient. A smaller allowance of bed space than normal may be given, on account of the open-air conditions of the wards. The hospital must contain a medical treatment unit, and provision for occupational therapy should be made. A central dining-hall is usually provided for ambulant patients.

ISOLATION HOSPITALS

Since the provision of a small isolation hospital with the full equipment and facilities proper to a large one is unduly costly, local authorities are advised to combine to provide a small number of large hospitals rather than a large number of small ones. A ward block should be used for only one disease at a time, and elasticity of accommodation is increased by having numerous small blocks. Each block should be not less than forty feet from the boundary or from any other block, and should contain only one ward unit; this can be of unequal portions, the larger being used for young children and older female patients. The size of the unit cannot be standardised by the number of patients that can be supervised by a sister, but must often be determined by the size of the hospital and the greater elasticity given by small units. About twelve beds in a ward

should be the maximum, but the committee found much to be said in favour of quite small wards, especially for scarlet fever patients. Each unit should contain two single-bed wards. Twelve feet should be allowed between bed centres, and 144 square feet per bed. A cubicle block, consisting of a number of separate single-bed wards, is used for cases of double infection and doubtful diagnosis, and for those diseases of which only small numbers of cases are admitted.

THE MENTAL HOSPITAL

Mental hospitals must not only provide facilities for the treatment of mental illness and, in large measure, of physical illness as well, but they introduce many other problems relating to the care of patients. The proportion of ambulant patients is very high, fully 90 per cent. Day accommodation is needed, entirely separate from the dormitories and including provision for indoor exercise, occupation, and entertainment. Special provision must be made for noisy, dangerous, or violent patients, for those who require constant supervision or specialised accommodation and nursing on account of recent illness, and also for infirm and senile patients. In order to secure a measure of freedom for patients, it is desirable to place the buildings for each sex some distance apart, and to use certain buildings not occupied by the patients as a boundary line. As the staff consists of both sexes, there must be some duplication of buildings. The committee found that the maximum size for a mental hospital had already been fixed by the Cobb Committee in 1923 and the Macmillan Commission in 1926 as one thousand beds, and accept that figure. They approve the usual arrangement of a combined hospital for the two sexes, with association between them as part of the weekly or daily entertainment in the recreation hall or on the main sports ground. On an average, provision should be made in the ratio of 56 women to 44 men.

They recommend that a separate group of buildings be provided at each mental hospital where treatment may be given in the early stages of mental illness, when there is a prospect of convalescence and recovery, without the patients associating with more serious and chronic cases. Such an "early treatment centre" should comprise at least a conjoint admission hospital for both sexes and a convalescent home for each sex. Sites should be reserved for a villa for semi-convalescent patients and a villa for milder cases of mental disturbance, but these buildings need not be built until the admission hospital or convalescent homes are found too small.

Great importance is attached to the site which should not be urban but not be so remote as to be inaccessible for patients on parole, or as to prevent the staff going to a town for recreation. A large country site, with water and electricity available, near a main road and within easy access of a town is recommended. Specific requirements are a sick hospital, a special section for excited patients, ward units for the senile and infirm, and rooms for special apparatus, therapy, and pathological investigations. The question of a research laboratory is left open. As to accommodation for the staff, each resident nurse should be provided with a separate bedroom in a detached nurses' home, but one nurse should sleep so near each dormitory as to be immediately available in case of emergency. About 75 per cent. of the male staff are married, and in order to avoid the capital expense of a large male nurses' block, it may be advisable to house some of the single staff in cottages on the estate until the number of those requiring permanent accommodation is known. Recreation rooms required for the male nurses might include a billiards room and a sitting-room.

MENTAL DEFICIENCY COLONIES

These colonies should have not less than 800 beds if adequate classification of all grades is to be carried out. There should be a simple structure in which patients may undergo physical training, and one or more hostels to complete the training of those patients who are likely to go out and become self-supporting. There are advantages in single-story buildings not only for low-grade cases but also for active children and adults who require frequent nursing attention. The committee oppose the erection of buildings wide enough to take three rows of beds in the dormitories. They favour concentration of washing arrangements on the ground floor of the villas.

Detailed and useful recommendations are given for the design of public assistance institutions, public baths, and swimming-pools.

AUSTRALASIA

(FROM OUR OWN CORRESPONDENT)

MATERNAL NUTRITION AND NEONATAL DEATHS

Dr. Jefferies Turner, for many years director of infant welfare in Queensland, has lately drawn attention to the decrease in neonatal mortality associated with adequate maternal nutrition. The infant mortality-rates in Queensland and South Australia used to be equal. Since 1931, however, the rate in South Australia has been lower, and it was much lower in 1936, when it reached to within one decimal point of the New Zealand rate, the lowest in the world. In an attempt to explain this difference, a comparison was made of the mortality-rates for the first month and for the next eleven months for the two States. In the three years 1934–36 the mortality-rate in Queensland during the eleven months following the first month has been consistently slightly lower than in South Australia, but this advantage has been more than counterbalanced by the lower rate during the first month in South Australia, as shown in the following Table :—

MORTALITY-RATE PER 1000 BIRTHS IN QUEENSLAND AND SOUTH AUSTRALIA

Year.	In first month.		In next eleven months.		In first year.	
	Q.	S.A.	Q.	S.A.	Q.	S.A.
1934 ..	29·0	22·3	11·6	13·2	40·6	35·6
1935 ..	27·3	23·8	10·0	11·1	37·3	35·0
1936 ..	26·3	20·8	9·9	10·3	36·2	31·1

The credit for the lower neonatal rates in South Australia, and more especially in Adelaide, in comparison with Queensland and Brisbane during the last five years, cannot be due to the work of the child welfare centres, for infants are only very rarely brought to these centres during their first week in which about 86 per cent. of this mortality occurs. Neonatal or first-month mortality can be reduced only (1) by improved health of the mothers, and (2) to a less extent by better management at birth. There is no reason to think that the latter is greatly superior in South Australia. Examination of the facts points to better nutrition as the real cause. The last seven years have been years of economic depression and unemployment, only partially relieved towards their end. The unemployed are concentrated mostly in the capitals, and it is they that are most exposed to malnutrition. In Queensland, the most important cause of malnutrition among women is the great deficiency of milk in their diet, which is especially harmful during pregnancy. Although much of this is due to want of knowledge,

and not to economic causes, it is greatly aggravated among those living on the edge of economic and nutritional adequacy. In South Australia during the "depression" the Government adopted the policy of supplying milk rations to the families of the unemployed. The distribution of milk to children and mothers began in 1930. In 1935 the South Australian Government asked the advice of the British Medical Association, and a committee of the Association strongly recommended that every child up to six years of age receiving rations should be given one pint of milk daily, children aged six to thirteen years half a pint, and expectant and nursing mothers one and a half pints in addition to other rations. This advice was taken by the Government and the milk ration is issued to every mother who produces a medical certificate of pregnancy and evidence that she needs the milk ration.

In the opinion of Dr. Turner, this is a true and adequate explanation. If this be so, two conclusions are imminent: first that the present high neonatal or first-month mortality of the Australian States can be considerably reduced, and secondly that this is a matter demanding the careful and earnest attention of all interested in saving infant life.

UNIVERSITY IDEALS

Several aspects of the life and organisation of the University of Melbourne were strongly criticised by Prof. F. Wood Jones, F.R.S., in a valedictory oration delivered in the Melbourne town hall before he left Australia to take up the chair of anatomy at Manchester and have since been the subject of fruitful discussion. In outlining the development of universities he pointed out that in the old world they began as quiet associations of teachers and students, giving an ideal expression of the mellow culture of the classical period. Sectarian religion at first played little part in the selection of scholars for such places, which were homes of cosmopolitan learning, and which transcended national boundaries and prejudices. By the end of the eighteenth century, however, they ceased to be democratic and had become hedged with the strangling growth of sectarian religious prejudices. The early nineteenth century had seen the establishment of the "new universities" like Berlin and London, which were unattached to any particular creed or school of thought. These were democratic institutions with the ideal of the greatest happiness for the greatest number. They instituted technical training, but it was no mere apprenticeship to some skilled vocation. The American universities established at the same time had inherited the defects of their origin as "continuation schools." When measured by the only true test, which was the preparation for intellectual life of all those who had enough intelligence to comprehend its meaning, universities, while attaining some degree of exclusiveness, could still fall far below the university ideal.

Melbourne had steered a middle course between the European university ideal and the more utilitarian ambitions of the American training college. But though the University of Melbourne may have been established on the broad non-sectarian lines laid down by the founders of the new universities, sectarian influences were at work at the very outset of the movement to establish their residential colleges. Frankly admitting that he expected little sympathy with his views, Prof. Wood Jones said that any sort of recognition of the claims of sect, creed, or religious denomination of any kind within the university was a retrograde step in Melbourne's attempt to cater for the intellectual life of the community; and that the division caused by sectarian issues was one of the outstanding defects of the intellectual life of Australia. He also said that the possibilities of free and stimulating discussion between teacher and student were almost non-existent in most of the faculties of Melbourne. Australia should aim at securing men of outstanding character and ability to fill university posts, and when they were secured, there should be a very much greater freedom of intercourse between staff and students than could prevail under the present conditions of understaffing.

A university should be regarded as providing a mental clinic for young people, rather than a machine which enabled them, in a mechanical way, to earn a living.

AN AUSTRALIAN BRANCH OF THE DIABETIC ASSOCIATION

Though Australia has a sprinkling of members of the parent Diabetic Association, it is obvious that the great distance from the headquarters and the different conditions must rob Australian diabetics of the full benefit of membership. For some time a few medical practitioners in the several capital cities have wished that some branch of the Association nearer home could supply Australian diabetics with information and social care. To this end a meeting of medical practitioners, almoners, dietitians, and diabetics was recently called in Sydney, and a provisional committee was elected to take steps to form an Australian branch of the Diabetic Association. The committee is representative and includes some prominent citizens, both diabetic and non-diabetic, besides dietitians and other diabetic workers. No medical men are included in the committee, although a small medical advisory committee is considered desirable. At the meeting the Minister for Health for New South Wales expressed a lively interest in the movement, and suggested that, if he were approached by the Association, funds for diabetic research might be made available at approved clinics.

The effect of belonging to a well-organised diabetic family, facing a common difficulty with courage, confidence, and knowledge, confers an important benefit on any diabetic's morale, and it is to be hoped that such a promising social service will receive the encouraging support from the profession which has been shown in Great Britain to be indispensable for its success.

POST-GRADUATE EDUCATION IN NEW SOUTH WALES

The opening of a post-graduate school at the Prince Henry Hospital, Sydney, on April 8th marks a new chapter in the history of post-graduate education in New South Wales. The New South Wales Post-Graduate Committee in Medicine, established by the University of Sydney, holds a general revision course each year, in which instruction is given at all the larger metropolitan hospitals. This is designed particularly for general practitioners, and its aim is to give the maximum of clinical instruction in a limited period. Courses dealing with special subjects are also arranged, week-end courses are held at various country centres, and instruction for higher degrees and diplomas is provided. In addition there are courses by visiting lecturers, and the committee arranges for residence at obstetrical, children's, and general hospitals, instruction in the diseases of children and infant feeding, attendance at clinics for the diagnosis and treatment of cancer and tuberculosis, and tuition in anæsthetics.

Attention has often been drawn to the advantages of having a post-graduate hospital where approved

students could bring up to date their knowledge of the rudiments of medicine and surgery, but undertake study in special branches. This need will shortly be satisfied at the Prince Henry Hospital. The Government of New South Wales, considering that this hospital would be more effectively administered by a board than by departmental officials, and at the same time desiring to provide a hospital where post-graduate training might be carried out, passed the Prince Henry Hospital Act, according to which the hospital is controlled by fifteen directors, representative of the medical profession, the University, the hospitals, and the Government itself.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

NEW YORK STATE ON MEDICAL CARE

AT its annual meeting, which opened on May 9th, the medical society of the State of New York received a report from a committee charged to formulate the principles and problems of a State health policy. Physicians, the general public, and the government are each assigned a responsibility in the provision of such a policy. The public must provide proper educational facilities, hospitals, and laboratories. If private citizens are unable to pay the price it may become necessary to provide them by government subsidy, but in this case it is held to be important that physical equipment only is subsidised and not personnel. The report then broached the controversial question of voluntary insurance for the middle-income class, but the decision of the meeting must be taken as a flat rejection of health insurance. In view of energetic propaganda among the members of the society as well as the public this is less surprising than is the energetic defence of the insurance principle by liberal members of the house of delegates.

Among guest speakers on the programme is Mr. Victor Negus of King's College Hospital, London.

THE CENSUS AND THE POPULATION

The fifth annual meeting of the Population Association of America was held at Princeton University from May 6th to 8th, when the subject chiefly discussed was the 1940 Census. Dr. Halbert L. Dunn, chief vital statistician of the Bureau of Census, described some of the problems which his department must face in attempting to provide accurate information. The most serious defect is the incompleteness of registration in the rural areas of the South; the second problem is the difficulty of estimating the population between the census years. He mentioned that the International List of Causes of Death needs revision. Even without such revision some attempts will be made to make separate classification, as for example of deaths from rheumatic heart disease.

A discussion took place between Mr. Frederick Osborn and Mr. H. P. Fairchild as to eugenic policy in this country. The latter contended that we have yet no mandate from the American people which will indicate what type of population is desired. Until quite recently, at least, certain of the captains of industry were seeking to import immigrants willing to do menial tasks, without regard to their intelligence. Mr. Osborn pointed out that we have about one million people whose defects are such as to render them unfit for social life or for the enjoyment of their own lives. A much larger section of the population is suitable for eugenic selection in order to diminish unfit stocks. In this respect conservative judgment must be exercised. While the conference was coping with the difficulty of taking immediate steps to improve the population, Dr. Kosmak pointed out that there is a great amount of proved pregnancy wastage, which is subject to immediate salvage. This includes at least 600,000 abortions yearly and 75,000 stillbirths.

SCANDALOUS BIRTH OF A BABY

An educational film was recently produced under the auspices of the American Committee on Maternal Welfare showing to lay audiences the elementary physiology and hygiene of pregnancy and parturition. In spite of its sponsorship—the committee includes representatives from such bodies as the American College of Surgeons and the section in obstetrics and gynæcology of the American Medical Association—the film was banned as obscene in some localities. These gave the pictures a news as well as an educational value and the enterprising picture magazine *Life* on April 11th printed four pages of pictures from the movie. Beforehand they sent a letter to each of their subscribers warning them of what was to come and giving them an opportunity to remove the centre pages in case they did not desire the children to see them. The authorities in the Bronx borough of New York City, in Pennsylvania, and in some parts of New England found the issue obscene and of 2 million copies some 10,000 were seized by the police thus ensuring the rapid sale of the remaining 1,990,000. A test case is going to the courts in New York State. The same courts will decide on the showing of the original moving picture. The State regents have at present decided that "the film has a high educational value" but "as motion pictures are attended by children of all ages in large numbers and by people of all creeds, colours, and races, this picture is not licensed to be shown in places of amusement." The Committee on Maternal Welfare is appealing against this decision. It is taken under Section 1082 of the Education Law with which the regents found the film "far in conflict." This law provides for licensing films unless they are "obscene, indecent, immoral, inhuman, sacriligious, or of such a character as to corrupt morals or incite to crime."

At their recent meeting in Washington the State and provincial health authorities adopted a resolution deploring the attitude of officials who have tried to prevent the sale of *Life* because of its treatment of this theme. "This action in itself indicates the necessity for such public health education."

POSTSCRIPT

By unanimous decision three justices of a Bronx court on April 26th found that the pictures published in *Life* on April 11th depicting the birth of a baby were not indecent and acquitted Roy E. Larsen, publisher of the magazine. Justice Perlman held that conceptions of decency are dynamic and not static and depend upon changes in "popular attitudes" "The picture story," he said, "was directly based on a film produced under the auspices of a responsible medical group. There is no nudity or unnecessary disclosure. The subject has been treated with delicacy."

WIENER KLINISCHE WOCHENSCRIFT.—The association that has always existed between this journal and the medical faculty of the University of Vienna is to be strengthened. Hitherto it has been the official organ of the Gesellschaft der Aerzte; it will now also speak for the University.

GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS

OPENING the 147th session of the Council on Tuesday last, Sir NORMAN WALKER referred to the death since the November session of Dr. E. Magennis, representing the Apothecaries' Hall, Dublin, "actually our oldest colleague, and a universally popular one"; of Mr. W. H. Dolamore, who had represented the English graduates in dental surgery from 1921 to 1934; and of Mr. J. W. A. McGowan, representing Scottish dental graduates. Dr. Edwin Matthew, he said, was not seeking re-election by the Royal College of Physicians of Edinburgh. He welcomed Dr. J. C. Flood and Dr. Douglas Kerr in the place of Dr. Magennis and Dr. Matthew.

INDIA

"We have received during the year," the President continued, "a number of friendly communications from the Medical Council of India, and I have had personal interviews with several past and present members. In constructing their first All-India Medical Act, the Indian Legislature had the benefit of our seventy-five years' experience. Sir John Simon, one of our wisest councillors, commented in 1873 'The first council was a first timid experiment of the legislature, and the powers of control given to the council were far too small.' The Indian Medical Council Act entrusts the Medical Council of India with powers of visitation and inspection which are wider in form than any possessed by the General Medical Council, either under the Act of 1858 or under the Act of 1886. It is due to the common sense of past councillors and the temperate guidance of wise presidents, notably my immediate predecessor, that our Acts work as well as they do. The Medical Council of India have made a good start on the enormous problems which confront them. They have not recently seen fit to recommend the inclusion of any further medical qualifications granted by universities in British India in the first schedule to the Indian Medical Council Act, 1933, as recognised medical qualifications for the purposes of the Act. It follows that no further proposals have been made in favour of the recognition of any such qualifications by the General Medical Council under Section 13 of the Medical Act, 1886.

BURMA

"But an important constitutional change in the position with respect to British India took place during 1937. On April 1st Burma ceased to be part of India in accordance with the provisions of the Government of India Act, 1935, and became a separate British Possession within the meaning of Part II of the Medical Act, 1886. By order in council of March 18th, 1937, Part II of the Act has been deemed to apply to Burma on and after April 1st, 1937, and on the separation of Burma from India the jurisdiction of the Medical Council of India ceased to extend to medical institutions in Burma by which medical qualifications are granted. The Medical Council of India had, however, already carried out the duty assigned to them by Subsection (4) of Section 11 of the Act of 1933 by making arrangements for the inspection of the medical courses and examinations of the University of Rangoon. The report of the first inspection of these courses and examinations in 1935 did not satisfy the Medical Council of India that qualifications granted by the University could properly be included in the first schedule to their Act, for reasons with which the executive committee of the General Medical Council found themselves in complete agreement. On the report of a second inspection a year later, the Medical Council of India found themselves able to modify their previous view, and in the light of some substantial improvements in the conditions made a recommendation, which was accepted, in favour of the inclusion in the schedule of the qualifications of M.B., B.S. granted by the University. The qualifications were not recognised for the purposes of the Indian Medical Council Act until Dec. 10th, 1936, and Burma had, as I have indicated, by this time become a separate British Possession, with the consequence that the sole responsibility of dealing with the question of the recognition of these qualifications under Section 13 of the Medical Act, 1886, rested with the executive committee of the General Medical Council in the discharge of the duty delegated to them by the Council. Having regard to the improvements in the courses of study and examinations of the University which the inspectors of the Medical Council of India had found on their second inspection, the executive committee resolved that the qualifications should be recognised, in the terms of the Act, for the time being. They thought it proper that the continuance of recognition should be made subject to the conclusion of arrangements with the University for a visitation by a visitor appointed on behalf of the General Medical Council, and this suggestion has been conveyed to, and accepted by, the University. The executive committee have again had the good fortune to secure the services of Sir Richard Needham as visitor of the University, and he proposes to combine this duty with further visitations of the University of Hong-Kong and of the King Edward VII College of Medicine, Singapore, in the course of the winter. I have reason to know that the Colonial Office and the local governments share the high estimation which we feel of the value of the reports made by Sir Richard on his visitations, and of the coöperation which he is able to secure from the authorities of the institutions visited.

PROFESSIONAL CONDUCT

"We have been asked by the Home Office to give such publicity as we can to the importance of the exercise of every precaution by registered medical practitioners to ensure the safe custody at all times of dangerous drugs and other poisons entrusted to them as a matter of professional privilege. The Home Office letter has already been published in the minutes of the meeting of the executive committee on Feb. 28th, but the committee felt that a reference to the matter here would help to draw general attention to a matter of public importance.

"In my address in May, 1933, I referred to the question of fee-splitting, a practice which is, I am sure, not so prevalent in this country as it appears to be in some others. The executive committee had before them in February, transmitted by the Dominions Office, a recent Act of the Legislative Council and the Legislative Assembly of Victoria, amending Section 15 of the Medical Act, 1928, of the State, which is to be found in the volume of our Minutes for 1931. Briefly, the amending Act provides that any registered medical practitioner who is guilty of the offence of fee-splitting as defined in detail in the Act shall be liable to heavy penalties.

ENTRIES TO THE PROFESSION

"Members will have observed with interest from the table prefixed to the Medical Register for 1938 which records the variations in the numbers of

registered medical practitioners that in 1937 the names of 2214 persons were added to the Register, including 273 in the colonial list and 13 in the foreign list. The total number removed for various reasons (mainly on evidence of death, which accounted for 125 fewer removals than in 1936) was 1090, so that the Register for 1938 contains 60,163 names, 1153 more than last year, and the largest number ever reached.

"The number of medical students registered in 1937 was 2297, a decrease of 247 as compared with the year before. This is the fifth highest number ever reached.

"A year ago the Council recommended the adoption of a new method of compiling the Students' Register. It will not come into operation until the beginning of the academic year 1938–39, but I think we may anticipate that the students' register for 1938 will be the forerunner of a series of more and more complete registers. There are times, and this is one of them, when it is important to know the number of students engaged in the study of medicine.

COMMITTEES

"The Curriculum and Education Committees, and not least their chairmen, cannot but be gratified by the reception accorded to their reports, and to the resolutions in regard to professional education, founded on their labours, which come into operation on Nov. 1st. Probably not everything that they have recommended can at once be accepted by all the bodies, but there is evidence of approval of the proposals that the medical curriculum proper—I know there are some who do not like the term—should be not less than five years, and of a general acceptance of the conviction that the vacations should be shortened, and that the time thus provided should be devoted to clinical work.

"As I have ventured to remind you on a previous occasion, the Council so long ago as 1864 recorded the opinion that while four winter, or three winter and two summer, sessions then formed the course of study, evidence should be produced that the remaining portion of the four years of the curriculum had been passed in the acquisition of professional knowledge.

"I note that the senior treasurer in presenting the report of the Finance Committee will have the satisfaction of announcing that the accounts of the general and branch councils for the year 1937 show a surplus of income over expenditure of £3390 4*s*. 9*d*."

A vote of thanks to the President for his address was moved by Mr. Harold Collinson and seconded by Sir Arthur MacNalty.

The two new members of the Council were introduced, Dr. Flood by Dr. D. J. Coffey, and Dr. Kerr by Dr. Sydney Smith.

The Council then proceeded to the consideration of penal cases.

PANEL AND CONTRACT PRACTICE

Health Insurance Policy in Eire

WHEN it was decided a few years ago to amalgamate the several approved societies into one national health insurance society, it was hoped that considerable economies in administration would follow, with ultimate advantages to the insured members. As the members have not reaped these advantages there is a certain degree of discontent which finds expression in letters to the press and in resolutions of trade-unions and other such bodies. The society had, however, to shoulder two burdens which have delayed the fruits of reform, although most of its critics fail to recognise this fact. In the first place, there was great disparity between the general approved societies both as to their financial strength and as to the benefits they provided for their members. Some of the stronger societies gave substantial additional benefits, such as dental, ophthalmic, and hospital benefits. The weaker societies were unable to do more than provide the statutory benefits, and the capacity of some to do this had nearly reached exhaustion. The strength of the stronger societies which came into amalgamation was neutralised by the weakness of the weaker, and up to the present the unified society has been unable to provide any additional benefit. The second clog on the development which it was hoped to attain by amalgamation is the fact that when amalgamation occurred it was necessary to dispense with the services of a large number of employees of the former societies and the entire burden of bursaries and compensation had to be borne by the unified society.

It is natural that those who formerly enjoyed additional benefits should be discontented when they find that such benefits are no longer to be had, but they do not realise that previously they were in a favoured position, as the strong financial position of the wealthier societies had been in a great measure due to the fact that they selected their members carefully as to health, thereby defeating the object of national health insurance. Medical benefit has never been among the benefits provided in the area of the Irish Free State, and although the societies were at liberty to provide it as an additional benefit, none ever did so. The demands now put forward include not only the restoration of additional benefits but the establishment of a full system of medical benefit. Unfortunately those who put forward this demand have not allowed their imagination to travel beyond the panel system which exists in Great Britain and in Northern Ireland, which, in the opinion of many, is unsuitable for application to the rest of Ireland and particularly to rural Ireland.

There has been for long an almost if not quite unanimous opinion in favour of establishing a system of treatment as part of the national health insurance system. But none of the committees or commissions which have studied the question have favoured the panel system. Both the Irish Public Health Council, which reported in 1920, and the committee of inquiry into the public medical services of the Irish Free State, which reported in 1926, recommended the establishment of a national or State medical service which would provide treatment for not only insured members and their families but also for those of similar financial status who would insure for the purpose voluntarily and for the poor who at the present receive treatment from the dispensary medical service. Such a national medical service would in fact embrace the present poor-law medical service. These recommendations received the unanimous approval of the medical profession and got general support among the public, but their carrying out was postponed for financial reasons.

It would be unfortunate if the path to the establishment of a thorough scheme of medical reform were to be blocked by the adoption of an unconsidered half-measure such as the panel system. It is true that the schemes of 1920 and 1926 would require reconsideration before adoption, and the best imme-

diate step would probably be the appointment of a commission to study the whole problem in relation not only to health insurance but to other branches of social insurance as well as to existing systems of medical treatment. Such a body should include persons with a knowledge of health insurance schemes on the continent of Europe and elsewhere.

A Monday Morning Problem

A foreign maid was engaged to begin her duties on a Monday in January. She crossed from the Continent on the Sunday, the crossing was not smooth, and on arrival at her place of employment late that night it was necessary to call in a doctor, who attended her then and again on the two following days. The employer asked the doctor on the Sunday night whether the girl was entitled to be treated as an insured person; the doctor, not unnaturally, was not sure and advised the employer to inquire at the Post Office. In due course he submitted an account for the night visit and for the two further visits, and the employer applied to the insurance committee for the withdrawal of the account. While perhaps it would have been better if the doctor had issued form G.P. 4 as notice of his intention to render an account (as provided under Clause 7 (2) of the terms of service), he can hardly be criticised for acting as he did, for not only had the woman never been in England before but, owing to the effects of sea-sickness, she had not begun her duties until after the treatment had finished. Actually she was under contract of service as from the Monday, and therefore on that day an insured person entitled to medical benefit. Although summoned on Sunday and in attendance before midnight, the doctor did not leave until the small hours of Monday morning, so that the patient became insured while the doctor was with her. The committee decided she must pay for the first visit, the account for the subsequent attendances to be withdrawn, the doctor receiving credit as for a temporary resident.

There is no waiting period for medical benefit. Some years ago a lad, who was due to enter upon insurable employment on a Monday, met with a bicycle accident on the previous Saturday. He was brought home by train on Sunday, and on the Monday when he should have begun his work it was necessary to call in a second doctor to give an anæsthetic for the reduction of a dislocated shoulder. The claim for an anæsthetist's fee submitted by the insurance practitioner was passed for payment after a ruling by the Ministry of Health that the patient had become an insured person, and therefore entitled to medical benefit, on the Monday.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM "SILVER DOCTOR"

IV

DURING the past few months a wide variety of opinions on the present state of British medicine has appeared in these columns expressing satisfaction, hope, indignation, and even despair. Prophets and philosophers have foretold mighty changes in the near future, pessimists have hinted at approaching revolution, and there have been such attacks on the established order of things as to threaten an onset of a universal anxiety-neurosis. Such are the classical indications of progress and from all sides comes the call for revision. Surgeons thunder for yet more surgery and specialists for increased specialism. Scientists demand additional research, clinicians plead for more art, and bureaucrats clamour for fresh legislation. Medical education is ruthlessly denounced and the habits and diets of all time are held to ridicule. Yet it needs but a little consideration to appreciate the healthfulness of this universal attitude of criticism. We are living in an era of vast developments, the world stirs from a long sleep, civilisation is threatened, and medicine, newly awakened to her responsibilities, hastens to put her house in order. Household reorganisation involves many considerations and everything from cellar to roof comes under review. Even the pots and pans call for attention. The medical curriculum has been the subject of much recent deliberation. Sweeping changes have been suggested and are now in process of organisation. There are three subjects which long service as a teaching and practising physician convince me as calling for recognition: (1) the teaching of elementary psychology; (2) the present-day neglect of senility as a clinical study; (3) the importance of medical ethics.

* * *

The diagnosis and treatment of abnormal nervous states (formerly confused under such terms as functional neuroses and neurasthenia) and the adequate study of early mental disease are two of the most notable advances of recent medicine. The late war loosed a flood of such cases and the conditions of modern life continue to add to their number. A knowledge of the normal is an obvious essential to any comprehension of the abnormal, yet in the present curriculum little provision is made for the student to acquire the elements of psychology. Shoals of so-called "functional" cases come in the first instance under the ken of the family doctor who has been taught little or nothing about them. Every medical student is stuffed with physiology as a necessary prelude to the understanding of pathology, and without any pretensions to making him a physiologist. Surely he requires to learn the elements of psychology on similar lines for identical reasons.

In my student days candidates for the M.D. and M.S. degrees of the University of London were required to pass a written examination in psychology, but at my own hospital no provision existed for instruction in this subject. Every student had to attend a limited number of demonstrations on mental cases at a local asylum, where we learned the rules of certification and precious little else. At that time Freud was hardly known and psychology was popularly confused with metaphysics. Shall I ever forget my own struggles? Hopeless flounderings in the writings of such authors as Kant and Locke made confusion worse confounded, till Providence guided one into the wise hands of the Bethlem School, where Maurice Craig and Savage saved the situation. Titchener in America had just produced his masterly primers of psychology, and Craig helped us to an understanding and appreciation of the subject. I shall never forget Savage's ward-rounds at Bethlem Hospital and the way in which he attempted to relate the rudiments of

psychology to the symptoms of early mental disease. The knowledge thus acquired, even if a good deal of it would not now be accepted, gave one a new outlook on medicine and nothing helped so much to the adequate understanding of the sick patient. One learned something of the intricate associations of mind and body and the varying degrees of nervous disorder brought about by physical disease, and vice versa. The later deletion of psychology from the M.D. examination has seemed to me nothing short of a calamity from the student's point of view.

Since then the knowledge of this subject has advanced by leaps and bounds, but nowadays psychology is regarded too much as the prerogative of specialists. Every medical practitioner needs a knowledge of its rudiments. It is a necessity to a due comprehension of so much of his work—the management and education of children, the "kinks" of the unstable, the treatment of nervous breakdowns, the choice of careers for adolescents—to mention only a few. Without it he fails to understand the nervous manifestations of physical disease and he cannot diagnose or remedy the maladjustments which cause so much of to-day's invalidism. Always there will be the need for psychological experts in whose hands psycho-analysis—that two-edged weapon—or any other form of detailed analysis must remain. The immediate need is not for more experts, but that every medical man's training shall include a sufficient knowledge of psycho-pathology to recognise and correct the slighter cases. How many anxiety neuroses could be nipped in the bud if correctly recognised and treated at their onset?

Let me quote a recent personal experience. Interested in a working-man's anomalous illness I called on his panel doctor. My lord of the Panel was florid, fat-and-fortyish, and his big Vauxhall car testified at least to his material success in practice. "Yes, my dear Sir, Jones was a puzzle and I sent him to hospital where he has been examined from stem to stern. Nothing wrong, Sir, nothing; just a case of nerves." Later inquiries revealed that no treatment of any kind was suggested for the wretched Jones and his nerves. "Nothing wrong Sir, only nerves!" Yet we call 'em Doctors!

* * *

In everyday medical practice children and old people form a notable proportion of a doctor's patients. Very properly the curriculum insists that every medical student shall have special instruction in the diseases of children, an enormous literature is devoted to the subject, great hospitals are consecrated to youngsters, and children's doctors are common objects in Harley-street. Viewed from a similar angle old age is curiously neglected. Few books or hospitals and no specialists at all, so far as I know, devote themselves to senility, and the average student learns little or nothing of its peculiarities. From every point of view this is a mistake which calls for correction. Senility is a comparative term with wide variations in its onset and the geography of its manifestations, yet it has a definite physiology and pathology as well as important principles peculiar to its management. The aged may not be so valuable to the State as their juniors—the one has a potential, the other a past value—yet the fact that they have survived the racket of life for so long surely merits reward. Yet to-day Medicine ignores what the State deems worthy of pensions! Moreover they often make or mar the practitioner's success. The old are proverbially garrulous!

It has been said that at 40 a man is either a fool or a physician. At 60 he is usually neither the one nor the other. To-day's sexagenarian is an individual who has garnered a definite series of bodily habits which he or she regards as essential to health, and to which he clings with a fortitude in itself wholly admirable. No drowning man ever clutched his straw more devotedly than these folk hold to their tenets. These may include any or every detail of their lives, whether matters of diet, exercise, clothing, sleep, or drugs. The wise doctor at his first interview with an elderly patient seeks to dig his beliefs into the daylight and does not interfere without mighty good reason. The customs of decades may not lightly be broken. On the other hand in them *may* be found the cause of present ill health. After all, habits whether in motors, horses, or humans *are* important factors!

Too few young practitioners realise the complex mentality of many old people; the curious timidity which grows with the years, often unrecognised by themselves but prone to peep out at any suspicion of failing health; the common defence-reactions which glory in any indication of deferred decay and pine for its recognition ("my doctor tells me that my arteries are those of a young man"); the persistent contraction of a mental horizon which eventually limits the aged man's interest to little save his own sensations; the protective slowness which comes to pervade his every function; all these and many others demand a sympathetic tolerance which some doctors forget in their dealings with senility.

On the physical side symptoms and signs in the aged may possess a different significance to similar conditions in younger subjects. Blood-pressure aberrations and pulse irregularities may have to be regarded from a fresh angle. Glycosuria or albuminuria are sometimes of less sinister import. Any change in the customary bowel habit of an old subject is an alarm-signal. A rectal examination of elderly men is obviously wise. The skin of the aged is a fine index of their senility, and an examination of the colour and blood-return in toe-nails affords helpful evidence of their circulatory stability. The easy day-sleep and broken night-rest of some old people are traps for the unwary, since senility is prone to beget regular irregularities of function and conduct. The ancient tag that a "man is as old as his arteries" has worn threadbare, and the radial *alone* cannot be accepted as safe evidence of any patient's entire arterial tree. Pain itself, most eloquent of all symptoms, may have a special explanation in the aged whose inelastic structures work stiffly and whose timidity is ever-ready to confuse a trifling discomfort with serious pain. In such cases confident reassurance and simple local treatment is often wiser than drugs.

* * *

The treatment of the aged is no easy matter. Many old people are suspicious, all are avid of attention, and the majority have fixed ideas as to what does or does not suit that mysterious entity which they are pleased to speak of as their "constitution." It behoves the practitioner to receive such information with respect, if not always with obedience. Idiosyncrasy does exist; yet all that glitters is not gold. I am not alone in recalling old dames who say that aspirin is poison to them and yet a prescription for acetyl-salicylic acid works wonders; and others who "must never take opium in any form" are relieved in no time by a few doses of pil. saponis co. Some elderly people stand drugs badly and it is well to begin with small doses. Local treatment

is beloved by old folk, but it is unwise to adopt drastic measures lest one disturb their roots.

What's that? "Elementary, Watson"—yes, of course: I'll ring off.

* * *

Every hospital physician has old patients in his wards and should make a point of demonstrating the many clinical peculiarities of senility to his students, who otherwise learn them only too sadly in later years by trial and error. Occasional lectures on old age would be invaluable. I am not sure that in the years ahead a Professor of Senility may not become a recognised institution in every medical school.

* * *

There is another unoccupied area for some inscrutable reason—a sort of no-man's-land—in medical education. It is strange, but unpleasantly true, that from the day he enters a medical school to the time he emerges as a qualified practitioner the medical student has little or no regular instruction on medical ethics. This is a grave reproach. School or university teaching includes little of business methods or financial procedures and few youngsters to-day keep personal accounts. The five or more hospital years are crowded with the acquisition of necessary 'ologies. Too often, and I recall vividly my personal experiences, the newly fledged doctor finds himself faced with a medley of practical difficulties of which he has had little warning. He knows nothing of the traps which beset the purchase of a practice or the taking of a partnership, the responsibilities of a locum tenens, or the multifarious odd jobs expected of every practitioner outside his obvious duties as a healer of the sick. He has learned how to open an abscess or treat a pneumonia, but has little idea of his duties towards fellow-practitioners or his rôle in a criminal case. The routine of certification or the giving of evidence in a law court is unexplored country. He speaks of "my patient" with pardonable pride but without any clear conception of what such proprietary assumption includes. He has the vaguest notions of his correct course if another doctor's patient asks his opinion, what his duties are with regard to consultations, or the proper procedure about fees. These examples could be multiplied. Yet mistakes in any such positions, easily made in all innocence, may land him into serious trouble. Is it any wonder that some practitioners never learn to appreciate the proper attitude towards patients or colleagues? Is it a matter for surprise that the unbusiness-like habits of medical men have become a byword and a reproach? Medical ethics is a comparatively small subject and its rules are mainly those of common sense, but what chance has the young doctor of acquiring its details without some guidance? It is true that most of it can be found in books, but goodness knows that our students have enough to read, and in any case this subject lends itself to the spoken more than to the written word. Half a dozen talks of an hour apiece would cover all the necessary ground and should be attended by every man before he is allowed to present himself for his final examination. Surely here is a job of work for our consulting physicians!

* * *

The reorganisation of the medical curriculum bristles with difficulty. It is hard to see the wood for the trees. The aforegoing suggestions indicate gaps which can be filled without great changes. After all it is the little foxes which spoil the vines.

*** *This concludes the four articles by "Silver Doctor." Next month A London Practitioner will be responsible for these columns.*—ED. L.

PUBLIC HEALTH

Public Assistance Beds

Dr. C. M. Smith, medical officer of health for Northants, and Mr. W. H. Abbott, county public assistance officer, have been inquiring into the causes of the steady increase in admissions to the council's public assistance institutions. In 1930 476 beds were available in these institutions, and although by using other rooms and crowding the beds this number has been increased to 553, the accommodation is still being overtaxed. Most of this accommodation is occupied by elderly chronic patients, more than two-thirds of the inmates being over 65 and having been in residence more than a year. In Northants as elsewhere the age-distribution of the population is slowly changing, and in the last thirty years the number over 60 has risen by 56 per cent. while the general population has increased by only 5 per cent. A comparison of the Northampton life table constructed by Richard Price for the years 1735–80 with the latest table for England and Wales shows, however, that in 200 years there has been very little change in the expectation of life of old people; at 60, for instance, the expectation of life in the old Northampton life table was 13·21 years and in the latest table 14·4 years for males and 16·5 for females. Old people are not living much longer, but more people now survive to old age.

Although there are no available statistics on the subject, the incidence of disability among the elderly is presumably not increasing; on the other hand not much decrease is to be expected in the future, since most of the illnesses of old people are due to degenerative processes incidental to their age. In recent years the attitude of the public towards the county institutions has altered; the stigma of the poor-law is rapidly disappearing, if it has not already gone; institutional life has become more pleasant and old people are no longer averse to seeking admission. They are also more ready to leave home, for the diminishing size of families means that there are now more old people without sons or daughters to care for them, and girls who used to stay at home now usually marry or go out to work. Often, too, the mother of the family also goes out to work or feels that she cannot do justice both to her children and to an elderly parent.

A survey of recent admissions to the institutions shows that practically no cases are admitted which cannot be regarded as urgent, and Dr. Smith can see no useful purpose in setting up machinery to control admissions. The report recommends, however, that a periodical survey of the inmates should be made, as old people are apt to remain in the sick wards when they might be transferred to the "house" or sent home. As regards the future, if fertility and mortality rates remain as they were in 1933 the number of people in Northants of 60 and over will increase from 30,000 in 1931 to 40,000 in 1985, while if the rates continue to decline as they have done in the last decade the number over 60 in 1985 will be about 50,000. Hence the demand on institutional beds is likely to increase still further during the next fifty years.

PARLIAMENTARY INTELLIGENCE

INCURABLE INSANITY AS GROUND FOR DIVORCE

IN the House of Commons on May 17th an amendment to omit from the Divorce and Nullity of Marriage (Scotland) Bill the paragraph which empowers the Court to grant a decree of divorce on the ground that the defender is incurably insane was negatived. Miss HORSBRUGH said that if they included incurable insanity as a cause of divorce they would have divorce decided not on facts that could be substantiated in court but on the opinion of experts. The more they studied the question the more they were faced with the difficulty of defining incurable insanity. Cures were being carried out in cases which in the past would have been considered incurable. In 1936, 2583 people were received into mental institutions; 962 married people were received in that year, and 504 married people were discharged. The largest number of cures was in the first three years. Taking the figures for 1936, of the 504 people discharged as cured, 459 were discharged after less than three years; between three and five years there were 18; between five and ten years, 22; between ten and fifteen years, 3; and over fifteen years, 2. The greatest fall came after the ten years' period. Some people considered that after five years in an institution a person might be looked upon as almost incurable, but the figures did not bear out that view.

The greatest experts on mental disease would decline to say of a particular case that they were certain it was incurable. In the present Bill incurable insanity was presumed after five years in an institution unless evidence could be brought to rebut that assumption. In English law the method was the reverse: the petitioner had to prove that the person in the institution was suffering from incurable insanity. In that connexion great difficulties had been experienced in England, and she believed that there the law would be a dead letter because it was almost impossible to get medical experts to declare that the illness of a particular person was incurable. They were told that the Scottish Bill was an improvement on the English, but if that were so and more divorces would be granted under it, they ought to be careful to see that that did not happen through the person in the institution being deprived of proper facilities for defence. She would like to see someone appointed by the Court to look after the defender's rights. Many of the mental experts she had consulted considered that this measure would retard the recovery of persons suffering from mental illness. Dr. Henderson of Edinburgh said:

"I would plead especially for those patients who are on the verge of a breakdown, who fear unsoundness of mind and who would fear it still more if the possibility was present in their mind of being discarded and deserted by the one who was more nearly related to them than anyone else."

Would it not be well, Miss Horsbrugh asked, for Scotland to wait to see how the experiment worked in England?

Major NEVEN-SPENCE said he was certain that this particular part of the Bill did not command the support of the majority of people in Scotland. He had asked many alienists to draw up a list of incurable forms of mental disease and they had all declined to do so as it was quite impossible. The involutional illnesses affecting women at the menopause and rather later might go on for much more than five years and yet be completely cured. Then there were such forms of mental disorder as acute mania and melancholia, from both of which a person might recover, though both were liable to recur. Twenty years ago a diagnosis of paralysis of the insane was practically a sentence of death within a short term of years; to-day there were thousands of general paralytics going about doing their ordinary work. The paranoids, who, next to the dementia præcox group, formed the largest group in the mental hospitals, could and did recover to a remarkable extent under hospital régime and treatment. This Bill was typical of the approach of the legal mind to these problems. While lawyers talked in terms of lunatics and lunacy the medical profession thought in terms of illness characterised by confusions, delusions, exaltation and depression, loss of memory, and various other things which varied according to the different factors at work: it might be arteriosclerotic changes, toxic conditions, or states of stress and worry, or a host of physical and environmental causes. The legal mind seemed to regard insanity as a disease entity, much as one might regard cancer or diabetes. He objected to this proposal to treat insanity as a ground of divorce. Why should they stop at mental illness; why not drag in the tuberculous wreck, the diabetic, the sufferer from cancer, or a host of organic nervous diseases which interfered with the purposes of the marriage relationship just as much as insanity? Wild horses would not drag from him a certificate of incurable insanity in any circumstances whatever, and he believed that to be the feeling of the medical profession as a whole.

Mr. ERSKINE HILL said that the principal reason why insanity should be a cause for divorce was well set forth by the Divorce Commission. Dr. Robert Jones, upon whose evidence the commission based their report, said that insanity was a physical disease and a mental disability also. It was one moreover which deprived the sufferer of his liberty, and of his civil, social, financial, political, and even domestic rights; a person who was a chronic and incurable lunatic was for all practical and legal purposes dead. Some very striking figures were given to the committee which considered the English Bill. Sir Arnold Wilson had found that only 1 per cent. of the total number of people treated recovered after five years. Mr. Sorensen had put the figure at 0·5 per cent. These figures showed an enormous preponderance of cases which did not recover. As to the suggested deleterious effect of the Bill on insane persons, the majority report of the Royal Commission had said that this idea arose from omitting to consider that only incurable insanity, found to be such after a long period of confinement, would be likely to be recommended as a ground and that such a recommendation should remove any apprehensions with regard to those whose confinement is of short duration or whose cases have any reasonable prospect of recovery. The courts had expressed again and again in cases of judicial separation the evil effects of an enforced single life.

Mr. T. M. COOPER, Lord Advocate, said he thought it was obvious from the figures that the chances of recovery for a married lunatic who had been at least five years in an asylum were very small; something in the order of the ratio of 24 to 550. Whether the law of Scotland was left as it was, or not, there would be occasional very hard cases; that was unavoidable. The committee should discard the suggestions of the medical experts, and of those who were alleged to possess the legal mind, and consider the question from the standpoint of the man in the street. Apart altogether from questions of recovery after five years, was it or was it not socially desirable that a marriage which had been subject for so long a period as five years to the complete frustration of all the privileges of matrimony should be permanent?

NOTES ON CURRENT TOPICS

IN the House of Commons on May 20th the Children and Young Persons Bill was agreed to on Report and read the third time. On May 23rd the Housing (Rural Workers) Amendment Bill was read the third time.

QUESTION TIME

THURSDAY, MAY 19TH

Cost-of-living Index for 1937

Mr. GEORGE GRIFFITHS asked the Minister of Labour the average cost-of-living index number for the year 1937 for rent, clothing, fuel and light, coal, gas, and miscellaneous items.—Mr. ERNEST BROWN replied: The averages of the percentage increases, over the level of July, 1914, recorded for the beginning of each of the twelve months of 1937 were as follows: rent (including rates) 59; clothing 102; fuel and light 78; coal 90; gas 48; miscellaneous items included in the index-number calculations 74.

Nutrition and Maternal Mortality

Miss WARD asked the Minister of Health if he could make any further report on the effect on maternal mortality of the special foodstuffs granted by the special commissioners through the National Birthday Trust Fund for expectant mothers.—Mr. ELLIOT replied: Particulars of results of this nutrition scheme, which is now being carried on by the Joint Council of Midwifery, covering the period from July 1st to Dec. 31st, 1937, have now been published. The following are the particulars:—

(*a*)= CASES RECEIVING SPECIAL FOODS. (*b*)= CASES NOT RECEIVING SPECIAL FOODS

Total No. of mothers (*a*) receiving food, and (*b*) not receiving food.	Puerperal death-rate from—		Total puerperal death-rate.	Maternal death-rate from associated causes.	Infant death-rate (stillbirth and neonatal).
	Sepsis.	Other causes.			
(*a*) 4446	Nil.	0·45	0·45	0·67	54
(*b*) 9040	1·77	1·77	3·54	1·33	83

Note.—All rates in the above tables are calculated per 1000 total births. These figures, which have been supplied by the medical officers of health of the areas concerned, are necessarily provisional.

Miss WARD: In view of the satisfactory results of the experiment may I ask what the next step is to be?—Mr. ELLIOT: We have to complete the experiment for which the Special Commissioner has given another £3000.—Miss WARD: When is the experiment likely to be over?—Dr. SUMMERSKILL: What is the reduction per 1000 of maternal mortality in these particular areas?—Mr. ELLIOT: Roughly speaking the total puerperal death-rate was 0·45 for those receiving foodstuffs and 3·54 for those receiving special food.

Bacteriological Standards for Milk

Mr. LIDDALL asked the Minister of Health if he was aware of the dissatisfaction felt by public health medical officers at the inadequate bacteriological standards for graded milks, and of their anxiety over the absence of any compulsory bacteriological standard for ungraded milk which was consumed by the vast majority of inhabitants of this country; and what steps, if any, he was taking to remedy this state of affairs.—Mr. ELLIOT replied: I am advised that the bacteriological tests prescribed for graded milks are adequate as a standard of cleanliness, but that a similar standard for all other milk is not practicable at the present time. I would, however, refer my hon. friend to the Government's proposals for promoting the cleanliness and purity of the milk-supply as set out in the White Paper on Milk Policy.

Experiments at Chatham Royal Hospital

Mr. LEACH asked the Home Secretary what was the nature of the research experiments carried out at Chatham Royal Hospital in connexion with testing the effects of high explosives, the number of animals used, the number killed, and the type or types of animals used.—Sir SAMUEL HOARE replied: I will send the hon. Member the particulars for which he asks.—Mr. RADFORD: Is it a sufficient answer to a question put down by an hon. Member of this House to say that the Minister will send a reply to the Member personally? May I submit, Mr. Speaker, that that does not give other hon. Members an opportunity of seeing an answer which may be of equal interest to all, and obviously in those circumstances the only thing to do would be for Members of the House to put down the same question on successive days.—Sir S. HOARE: May I say I have had some consultation with the hon. Member who put down this question which raises considerations of a very confidential character in connexion with these experiments. It was on that ground alone that I gave the answer to which the hon. Member refers—The Speaker said that he would not like to give a general ruling without regard to the particular nature of the question. He would not say that there might not be occasions when it would be necessary to take the course adopted by the Minister in this case.

National College of Physical Training

Major WHITELEY asked the Parliamentary Secretary to the Board of Education if he was now in a position to make an announcement as to the site for the National College of Physical Training.—Mr. KENNETH LINDSAY replied: Yes, Sir. My noble friend has considered a number of possible sites and has decided, in consultation with the National Fitness Council for England and Wales, that the most suitable site for the purpose is one of 220 acres situated on the Merstham Manor Estate, which, although only 17 miles from London, is in attractive open country adequately protected. I am glad to say that preliminary negotiations for the purchase of the site have been completed.

MONDAY, MAY 23RD

Patent Medicines

Mr. DAVID ADAMS asked the Minister of Health whether he was aware that in 1937 a Select Committee of the House of Commons estimated that the amount spent each year in the United Kingdom on patent medicines was between £20,000,000 and £28,000,000, as against an annual expenditure upon drugs under the national health insurance scheme of only £2,500,000; and whether, in view of this persistence of unskilled and often dangerous self-treatment, he would consider changes in the law whereby drugs sold under a proprietary name should at least be regulated as stringently as ordinary foods and drugs were under the Food and Drugs Act, 1875.—Mr. BERNAYS, Parliamentary Secretary to the Ministry of Health, replied: I am not sure exactly what change in the law the hon. Member has in mind, but I would refer him to Clause 6 of the Food and Drugs Bill now before Parliament which not only strengthens the present law regarding labels isued with drugs, but also applies to advertisements containing false descriptions of drugs or misleading statements as to their nature, substance, or quality.

Industrial Contributions to Hospitals

Mr. ROBERT GIBSON asked the Secretary to the Treasury when arrangements recently decided on for the system of collections for hospital fund purposes from industrial and non-industrial workers directly employed by the Government at Home, by arrangement with these workers by way of deduction from their pay, were likely to be completed; and if he could give an assurance that the contemplated central machinery would not involve a diminution of the funds collected from the workers for hospital purposes.—Captain EUAN WALLACE replied: It is hoped to bring this scheme into operation as from July 1st next. Contributions will be deducted free of charge by Government departments from the pay of their employees and transmitted to a committee of the British Hospitals Contributory Schemes Association for distribution to the appropriate hospital funds. The amount transmitted to any individual hospital fund will be the net amount after deduction of the expenses incidental to this distribution. It is estimated that after the first two or three years the expenses will not exceed 5 per cent. of the total receipts.

A Prisoner's Mental Condition

Sir JOHN MELLOR asked the Home Secretary whether his attention had been drawn to the evidence given at the trial of Bernard Anthony O'Sullivan, who pleaded guilty to a charge of attempting to murder a boy aged nine;

whether he had investigated the allegation of the medical officer of Brixton Prison that, while at Broadmoor, O'Sullivan had declared that he thought it right to murder young children; whether he was satisfied that O'Sullivan's record and condition justified his release in 1935; and whether he would take more effective steps to prevent the release of dangerous criminals and lunatics.

Mr. SORENSEN asked whether the right hon. gentleman would make inquiries as to the reason for O'Sullivan's discharge from a mental hospital; and whether, in view of this man's record of mental instability, he would speedily have him transferred to Broadmoor or some other suitable mental hospital.—Mr. GEOFFREY LLOYD replied: In March, 1923, O'Sullivan was convicted of wounding with intent to murder and was sentenced to 10 years' penal servitude. While serving this sentence he showed no signs of mental abnormality and, having earned by good conduct and industry full remission marks, he was released in the ordinary course on licence in October, 1930. In April, 1932, he pleaded guilty at Manchester Assizes to a charge of larceny and was sentenced to three months' imprisonment, with the result that he became liable to serve in addition the remnant of his penal servitude sentence. At this time, he was found to be insane and he was transferred from prison first to Rainhill Mental Hospital, and subsequently to Broadmoor, where he remained until Jan. 16th, 1935, on which date his sentence expired. On the expiration of his sentence the powers and responsibilities of the Home Secretary with respect to his custody came to an end, but as he was still insane he become liable to detention under the ordinary provisions of the Lunacy law. Accordingly he was removed to Banstead Mental Hospital as a rate-aided patient. The question whether, and if so when, the patient should be discharged thereupon became one for the Visiting Committee of that hospital. Persons like O'Sullivan who are sentenced to some specified term of imprisonment or penal servitude are in a different position from persons who, when charged with a criminal offence, are found insane by the Court and ordered to be detained during His Majesty's pleasure. When a person is ordered to be detained during His Majesty's pleasure, the responsibility of deciding whether such a patient has sufficiently recovered to be released without undue risk rests on the Home Secretary. The decision in such a case is frequently a matter of great difficulty and, as is known to those hon. Members who from time to time make representations to the Home Office about the release of such patients, great care is taken to make all necessary inquiries and to weigh the various considerations which arise.

O'Sullivan is at present under careful observation in prison and if, as a result of that observation, he is certified to be insane, immediate steps will be taken for his removal to Broadmoor.

TUESDAY, MAY 24TH

Overcrowding in Glasgow

Mr. BUCHANAN asked the Secretary of State for Scotland the total number of houses in Glasgow which were occupied that were at present condemned either as being overcrowded or insanitary, or unfit for human habitation; and the total number of families which had been rehoused from houses in the above circumstances during the past twelve months.—Mr. WEDDERBURN replied: According to the report on the survey of overcrowding made by the corporation in the winter of 1935, which contains the latest available information on the subject, 74,952 houses in fit condition were then overcrowded. I am informed that 10,148 additional houses, still occupied, are on the corporation's list of insanitary houses to be dealt with under the Housing Acts as soon as alternative accommodation becomes available. With regard to the last part of the question, 3006 families have been rehoused from unfit or overcrowded houses during the past twelve months.

Impure Milk

Mr. WESTWOOD asked the Secretary of State for Scotland if his attention had been drawn to the report of the public health authority as to the filthy condition of milk being supplied to the Milk Marketing Board from the county of Angus; and, if so, what action he proposed to safeguard the health of the people from an impure milk-supply.—Mr. WEDDERBURN replied: I have seen a press report of a meeting of the public health committee of Angus County Council to which I presume the hon. Member refers. The milk referred to in the report was supplied by a single producer and is not now being accepted by the Board.

German Monopoly of Chemical Compounds

Mr. DAVID ADAMS asked the Chancellor of the Duchy of Lancaster, as representing the Lord President of the Council, whether his attention had been drawn to the fact that in case of war the British Empire would be without access to important chemical compounds of which Germany had a virtual monopoly; whether he was aware that German firms producing these chemical agents did not as a rule grant licences for manufacture in this country; and whether any Government action was contemplated in view not only of possible war-time contingencies, but also of the continuous and urgent needs of the British tropical Empire.—Earl WINTERTON replied: The Lord President is well aware of the fact that the discovery of new chemical compounds of certain kinds, particularly those which can be used in the treatment of some tropical and other diseases, at present depends largely on research work undertaken by industrial concerns in Germany, with the consequence that large supplies of these new substances can for a longer or a shorter period be obtained only from abroad. It is for this reason that the Government have approved the proposal of the Medical Research Council for expenditure at the rate of £30,000 per annum on research in chemotherapy, to enable this country to play a greater part in future in making new discoveries in this field.

In reply to a further question Earl WINTERTON said that since questions were asked on this subject about a week ago he had gone into the matter very carefully with the Lord President's Department and the Medical Research Council. There were other grants in connexion with this particular research in addition to this new sum of money which, in the first two years, would be largely expended in making new premises. The result would be greatly to enlarge the field of research. On the question of research he was satisfied, as was the Lord President, that sufficient was being done. The matter might be reviewed at some later date.

Scotland and Factory Regulations

Mr. ROBERT GIBSON asked the Home Secretary whether the regulations to be issued by the Home Office under the new Factory Act would apply directly to Scotland, or if a revised issue would be made from the Scottish Office applicable to Scotland; when the regulations would be available for Scotland; and if he had any statement to make on the subject.—Sir SAMUEL HOARE replied: Regulations under the Factory Acts are made by the Home Secretary for all parts of Great Britain, and are not separately issued from the Scottish Office. As regards the latter part of the question, I would refer the hon. Member to my reply on Thursday last. I have since approved the issue of further draft regulations in addition to those previously mentioned.

FOUNDERS DAY AT MANCHESTER UNIVERSITY.—The honorary degree of doctor of science was conferred on Sir Henry Dale on May 18th by the chancellor, Lord Crawford, during the celebration in Manchester of the hundredth year of local government. In presenting Sir Henry Dale to the chancellor, Prof. T. W. Manson referred to work done "in the dark, unexplored places where physiology, biochemistry, and pharmacology meet," and of its benefit, actual and potential, to mankind at large. And Sir Henry Dale, in reply, spoke of the unique opportunity of medical research in the fullest sense awaiting endowment at Manchester "by some fairy godfather or syndicate of fairy godfathers." In Manchester, if anywhere, he said, were conditions for the growth of a great centre of medical research. At Oxford, before the princely endowment of research, it had been needful for the benefactor first to create in the environs of that ancient city a great industry and industrial population. Manchester had no need to begin by creating an industrial population for its purpose; it already had a great hospital devoted to the medical care of the dense population which industry had created around it.

CAMPAIGN AGAINST MALNUTRITION

ON May 14th the Children's Minimum Council held a provincial conference at Newcastle-upon-Tyne attended by over 600 people, among whom were delegates from 214 organisations in Northumberland and Durham, including 23 local authorities. In an opening address the LORD MAYOR spoke of the right of every individual to full health, and said he hoped the conference would hasten the pace of the drive for improved nutrition.

Prof. V. H. MOTTRAM gave a theoretically good "minimum" diet for correct nutrition (for an adult male) as follows:—

	per day.
5 oz. cheese at 8*d.* lb.	2½*d.*
2 lb. 3½ oz. bread (brown) at 2½*d.* lb. ..	5*d.*
4 oz. cabbage (raw) at 3*d.* lb.	½*d.*
	8½*d.* (4*s.* 9½*d.* a week).

He pointed out that even if one could bear the monotony of this diet, it would be almost impossible to digest. He quoted Sir John Orr's estimate that over 4½ million people (including a quarter of the children of Great Britain) spend less than 4*s.* per week on food. Their diet must be deficient in every constituent. "It is the mothers and children who suffer most," he declared. "By the time the children come under the care of the education authorities they are already damaged goods. If we could only feed the children and the expectant mothers, we should do much to produce a decent nation."

The Ven. L. S. HUNTER, archdeacon of Northumberland, referred to the necessity of achieving adequate wages as well as higher unemployment allowances. It was necessary to think also of the human personality, a problem which could not be solved unless we thought of building up the whole life of the people.

At the second session, over which Prof. DAVID BURNS presided, Miss ELEANOR RATHBONE, M.P., chairman of the Children's Minimum Council, said that the main points of the Council's programme were adequate unemployment allowances, free milk for all school-children, cheap milk for mothers and children under five, and school meals as a part of the school routine; it was held that the major part of the cost of free milk and meals should be borne by the National Exchequer. The main excuse given for scales inadequate to meet minimum needs was that in the case of families with several children they would exceed wage-rates in unskilled occupations. This unfortunately was true, but the objection was met, in the case of the Unemployment Assistance Board, by the rule that the scale payments must not exceed the normal earnings of the recipient. Miss Rathbone personally believed that the only permanent remedy for this difficulty was to supplement wages with family allowances. Otherwise, there must always be a discrepancy between wages, which bear no relation to the size of the family, and any kind of assistance which does bear such a relation. Meanwhile the Council went on pressing for higher rates, but also pressed for communal services in kind, in such a way as to supplement the incomes of the unemployed and the lower-paid wage-earners alike.

The Council also asked that "a daily ration of fresh, clean milk should be made available, free of cost, to all children attending (*a*) public elementary, and (*b*) State-aided secondary schools, both on school days and holidays." At present milk was not supplied free, but at ½*d.* for a third of a pint, and only about half the elementary school population were receiving it. This modest success was largely due to the fact that the increased consumption of milk was also desired by the farmers and the milk industry. The usual reason given why more children did not buy milk was that they did not like it. No doubt the milk habit did take some time to spread among children who had not been used to milk at home, but recent experimental schemes showed that the excuse that they do not like milk was often given in order to conceal the fact that their parents could not afford to pay for it. In Merkinch school, Inverness-shire, free milk was provided for all scholars by the Inverness-shire county council. Only 12 children out of 770 did not take it. The fact that some children paid for their milk, while others did not, made the whole scheme troublesome to the teachers and it had a taint of charity about it which deterred parents and children. The only way to ensure that the children who needed milk got it was to provide free milk for all school-children.

But even if the milk scheme were developed to the utmost, it would not remedy the dietary deficiency. Children could not live by milk alone. The Council had devoted special attention to the question of school meals, and it was startling to find how little progress had been made since pre-war days. It appeared that the number of children who received meals during the year had not increased since 1911. At any one time during the year only about 2 per cent. of the school population got solid school meals. The taint of charity hung about meals as well. Often they were provided only for those who could not pay, and parents who were proud and self-respecting did not like to apply for them. The Children's Minimum Council considered that the school meal should be provided as an ordinary part of the school routine. Children need not take them unless they wanted to, but they should be encouraged to do so and made to feel that it was the normal thing. At present the Board of Education tried to insist on a medical test before the granting of school meals and milk free, but there was no recognised standard for medical officers to work on and in estimating malnutrition there was a real danger that the average might be taken as the standard. Many doctors had emphasised how difficult it was to discover from a single physical examination whether or not the health of a child was being impaired by malnutrition, and careful observers might come to entirely different conclusions. The system was most unsatisfactory and the medical test should be replaced by an income test. An inquiry made by the Council, which covered 939 children whose parents were members of unemployed clubs in various districts, showed that two-thirds of these (over 600) were getting neither free milk nor free meals. Sweden had just decided to provide a free meal for all school-children, and if Sweden could afford to do this, surely England could afford it too. Many local authorities were putting forward ambitious school-building programmes which included no dining-rooms or canteens even for the senior schools. This was singularly short-sighted because even if we could not afford to provide a free meal for everyone now, we hoped it might be possible within the next fifty years. Miss Rathbone urged that some of the milk now sold at 5*d.* and 6*d.* a gallon for manufacturing should be diverted to the needs of the mothers and children, and suggested the formation of a local committee to continue the pressure on the Government through all Northumberland and Durham organisations, and added: "In tackling the Government, you need to combine the methods

of the importunate widow, the ancient mariner, and Sisyphus."

In the discussion that followed Miss Rathbone's speech it was proposed that the supply of free meals should be taken out of private hands, that universal nursery schools should be provided to remedy the malnutrition caused by the gap of two years between the time when children leave the child welfare clinic (at 3) and the time when they start school (at 5), and that all scholarship students should be granted free meals and clothing.

Dr. GERTRUDE HICKLING agreed with Miss Rathbone that there was no standard of values on which medical officers could assess malnutrition, and that the economic standard was the only reliable basis to work on. By the time there was evidence of malnutrition it was often too late. She referred to the experiment in Walker-on-Tyne, arranged by the Milk Marketing Board and the Commissioner for the Special Areas, by which pregnant and nursing mothers and children under five could buy milk for 2*d*. a pint. The scheme was a great success. The medical officers in the area had also been told that they might give free milk where wages were very low.

OBITUARY

DR. WADE FROST

THE death at Baltimore early this month of Dr. Wade Hampton Frost, professor of epidemiology at Johns Hopkins, has severed a rather intimate international connexion, for Frost was a teacher of world-wide influence. He died in the Johns Hopkins Hospital of cancer of the œsophagus at the age of 58. Son of Dr. Henry Frost of Charleston, S.C., a surgeon in the Confederate army, Wade Frost was brought up in Virginia, graduating there in arts in 1901 and medicine two years later. In 1905 he joined the U.S. Public Health Service and from 1909 to 1913 initiated the studies on the epidemiology of poliomyelitis, diphtheria, and tuberculosis, on which he worked throughout his life. For a while he was in charge of the river pollution laboratory at Cincinnati, but when the U.S.A. came into the war he was called to direct the bureau of sanitary service of the American Red Cross. In 1919 he joined the newly organised school of hygiene at Johns Hopkins, becoming its first resident lecturer and later professor of epidemiology. He finally retired from the official public health service to become dean of the school. At the time of his death he was serving one State as consultant in stream pollution, another as referee in tuberculosis, and a third in measures for the control of pneumonia. His death has left a deep sense of loss at Johns Hopkins, where he was valued not only for his clear and logical method of reasoning, but for his subtle and penetrating wit, and an austere sense of duty. One line of appreciation may be quoted here: "No one can recall the mean or malicious as his contribution in any relationship."

JOHN ANDERSON, C.I.E., M.B. Edin.

Colonel Anderson, who died on Sunday at Hyde Park Gate in his eighty-fourth year, was one of the best known and best loved members of the Indian Medical Service. Born at Inch, Co. Donegal, in 1855, he entered the I.M.S. in 1878 and served through the second Afghan campaign. After being transferred to civil employment he held surgeoncies at Simla and Lucknow, and was for some years principal of the Agra medical school. Before the exact causes of cholera and other plagues were fully known he was a pioneer in measures for their control. His services as a surgeon, and not least as an oculist, were also in request throughout the United Provinces. He was a born organiser and administrator, and his help was sought in providing relief during many famines in India. A colleague writes of him as "one of the most charming personalities that had ever been known in the city of Lucknow. He was a great sportsman and big game hunter, and was in demand at all social functions for his wit and bonhomie. After his retirement he never missed the annual dinner of the I.M.S. in London and was always called to draw on a fund of stories that never ran dry." Colonel Anderson married first the daughter of J. B. N. Hennessey, C.I.E., F.R.S., and after her death in 1924 the widow of Surgeon-General J. Cleghorn, C.S.I., who survives him.

MEDICAL NEWS

University of Oxford

Dr. R. H. S. Thompson has been elected to the Radcliffe medical fellowship and praelectorship in medical science at University College, Oxford.

The board of the Faculty of Medicine has given notice of the following altered regulations for the examination in human anatomy for the First M.B., to take effect from Jan. 1st, 1938:—

"The examination will include (*a*) a written paper and (*b*) a practical and viva voce examination. Three hours will be assigned to each part.

"In the written examination, candidates will be expected to show their acquaintance with the structure of the human body, including general topography; the gross and minute anatomy of organs and tissues, with special reference to processes of growth, development, and structural adaptation; human embryology; and neurological anatomy.

"In the practical and viva voce part of the examination candidates will be required to show their knowledge of human anatomy by reference to dissected material; to recognise and describe microscopical and embryological specimens, normal radiographs, and special dissections; and to give evidence of their acquaintance with surface anatomy on the living subject."

University of Cambridge

Three assistants in research to the regius professor of physic will shortly be appointed to hold office from Oct. 1st. They will be assistant in research in radiology (diagnostic), assistant in research in psychiatry, and assistant in research in pathology (morbid anatomy and histology). The first appointment will carry a salary of £600 a year and each of the other two of £500 a year. The appointments will be made for three years in the first instance. Further information may be had from the secretary of the appointments committee of the faculty of medicine, department of pathology, Tennis Court-road, Cambridge, to whom applications should be sent not later than July 1st.

National University of Ireland

It has been decided to confer the hon. degree of M.Ch. on Mr. E. E. Ware.

Royal Society of Medicine

An award of the Norman Gamble prize will be made in October.

This prize, which is of the value of £50, is awarded every four years for the best original work in otology carried out since the last award. Applications should be sent to the secretary of the Society, 1, Wimpole-street, London, W.1, not later than Sept. 30th.

University of London

Mr. G. R. de Beer, D.Sc., has been appointed to the university readership in embryology tenable at University College. For the last eleven years he has been Jenkinson lecturer in embryology and senior demonstrator in zoology and comparative anatomy in the University of Oxford.

The degree of D.Sc. in biochemistry has been conferred on Mr. W. T. J. Morgan.

Society of Apothecaries of London

The following candidates have satisfied the examiners for the Mastery of Midwifery :—

H. R. England, R. S. Cromie, Louise Alice Matheson, and Sumitra bai Shrikhande.

At recent examinations the following candidates were successful :—

Surgery.—A. Backman, Guy's Hosp.; F. E. Buckler, Lond. Hosp.; R. M. Corker, Guy's Hosp.; P. H. Hay-Heddle, Westminster Hosp.; T. E. Ooi, Univ. of Oxon. and Guy's Hosp.; and C. L. Summerfield, Univ. of Leeds.

Medicine.—W. H. Bayley, St. Thomas's Hosp.; P. C. Conran, Univ. of Camb. and Middlesex Hosp.; O. H. Galloway, Roy. Colleges, Edin.; J. C. B. Nesfield, Univ. of Camb. and St. Mary's Hosp.; T. E. Ooi, Univ. of Oxon. and Guy's Hosp.; and C. Webb, St. Bart.'s Hosp.

Forensic Medicine.—P. C. Conran, Univ. of Camb. and Middlesex Hosp.; O. H. Galloway, Roy. Colleges, Edin.; J. C. B. Nesfield, Univ. of Camb. and St. Mary's Hosp.; T. E. Ooi, Univ. of Oxon. and Guy's Hosp.; and C. Webb, St. Bart.'s Hosp.

Midwifery.—C. V. Arthur, St. Mary's Hosp.; R. M. Corker, Guy's Hosp.; J. C. Gregory, Univ. of Camb. and St. Bart.'s Hosp.; C. R. Morgan, Guy's Hosp.; C. L. Summerfield, Univ. of Leeds; and W. E. Swanston, St. George's Hosp.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery :—

W. H. Bayley, A. Backman, F. E. Buckler, P. C. Conran, O. H. Galloway, P. H. Hay-Heddle, J. C. B. Nesfield, T. E. Ooi, and C. L. Summerfield.

University of Liverpool

Dr. T. B. Davie, professor of pathology in the University of Bristol, has been appointed to the George Holt chair of pathology in succession to Prof. J. H. Dible, who is now professor of pathology in the British Postgraduate Medical School.

Dr. Davie, who is 42, graduated in arts at the University of Stellenbosch, South Africa, in 1914. During the war he served with the Royal Air Force and in 1918 he returned to South Africa where he held the post of science master in various schools. He returned to this country in 1924 and studied medicine at Liverpool. He graduated with first-class honours in 1928, and after holding resident posts at the Royal Infirmary was appointed junior lecturer in pathology in the university in 1929. In 1931 he obtained his M.D. degree and the membership of the Royal College of Physicians of London. In the same year he was appointed pathologist to the Corporation Hospital, and two years later he returned to the University of Liverpool as senior lecturer in pathology. He held this post till he was appointed to the chair at Bristol in 1935. Dr. Davie has published papers on medullo-epitheliomas of the brain and retina; on adenolymphoma of the salivary gland; and on renal rickets.

The title of professor of tropical diseases of Africa has been conferred on Dr. T. H. Davey while holding the directorship of the Sir Alfred Lewis Jones research laboratory, Sierra Leone.

Dr. Davey graduated M.B. at the University of Belfast in 1925 and obtained the degree of M.D. with commendation in 1934. He has previously held the posts of research assistant and assistant director at the laboratory.

Research Defence Society

The annual Stephen Paget lecture will be delivered to this society at the London School of Hygiene, Keppel-street, W.C., on Thursday, June 9th, by Prof. Charles Best, F.R.S. He will speak on insulin and diabetes.

National Fitness Council for England and Wales

This council has set up a medical committee "to take such action as may be found desirable in order to enlist the coöperation of the medical profession in promoting the policy of the council; and to consider and report on the medical aspect of the council's work." The following have been appointed members: Lord Dawson (chairman), Sir Kaye le Fleming, Dr. Adolphe Abrahams, Dr. Anna Broman, Dr. George Chesney, Dr. G. E. Friend, Major A. H. A. Gem, Dr. J. A. Glover, Dr. Haden Guest, Dr. L. P. Lockhart, Captain J. G. Paterson, Dr. J. R. Rees, and Miss P. Spafford.

Surgeon Rear-Admiral Leonard Warren, O.B.E., has been appointed honorary physician to the King.

Colonel R. N. Chopra, F.R.C.P., professor of pharmacology and director of the School of Tropical Medicine in Calcutta, has been elected an hon. fellow of the American Society of Pharmacology and Experimental Therapeutics. This is only the fourth time this honour has been awarded to someone who is not an American.

Welsh National School of Medicine

Dr. W. H. Tytler has been appointed to the David Davies professorship of tuberculosis in succession to Prof. Lyle Cummins, who is to retire in September. Dr. Tytler is at present research bacteriologist to the Welsh National Memorial Association.

National Association for the Prevention of Tuberculosis

Mr. Walter Elliot, the new Minister of Health, will open the annual conference of this association on June 30th in place of Sir Kingsley Wood. The conference is being held at B.M.A. House, Tavistock-square, London, W.C.

Indian Medical Service

The annual dinner of the service will be held at the Trocadero Restaurant, London, on Tuesday, June 14th, at 7.15 P.M., when Major-General E. W. C. Bradfield will preside. The Marquess of Zetland, Secretary of State for India, will be the guest of honour. Tickets may be had from the hon. secretary, Major Sir Thomas Carey Evans, Hammersmith Hospital, Ducane-road, London, W.12.

International Congress of Surgery

The German Surgical Society, to which most of the Austrian members of the International Society of Surgery belong, is at present in collaboration with the Viennese committee, making arrangements for this congress, which is to take place in Vienna from Sept. 19th to 22nd. The following subjects will be discussed: Surgical treatment of hypertension, bone-grafts, and surgical treatment of pulmonary cysts and tumours. Nearly 200 speakers have promised to take part. On the occasion of this congress the Messageries Maritimes are organising a cruise, which will leave Marseilles on Sept. 4th and will give surgeons the opportunity to attend operative demonstrations at Naples, Athens, Istanbul, Odessa, Bucharest, and Budapest. The cruise is due to reach Budapest on Sept. 18th in time to reach Vienna at 5.25 P.M. that day. Further information may be had from Prof. G. Grey Turner, British Postgraduate School, Ducane-road, London, W.12. Messrs. Thos. Cook and Sons are responsible for the travel arrangements.

Royal Institute of Public Health and Hygiene

A congress will be held by this institute at Blackpool from May 31st to June 4th under the presidency of Lord Cozens-Hardy. The work will be divided into five sections, which will meet concurrently. In the section of State medicine and industrial hygiene Dr. C. O. Stallybrass and Dr. H. G. Smith will discuss changing views as to the spread of infections. The second session of the section of women and children and the public health will be devoted to a discussion on the new maternity services, which will be opened by Dr. Andrew Shinnie, Prof. A. Leyland Robinson, Dr. J. A. Longworth, and Miss A. L. Culverhouse. During the proceedings of the section of tuberculosis there will be a symposium on tuberculosis in relation to the pneumonoconioses in which Dr. H. Midgley Turner, Dr. W. E. Cooke, and Dr. J. V. Sparks will take part. In his presidential address to the section of rheumatism and allied diseases Sir Morton Smart will speak on muscle action in relation to repair of joint tissue, and Dr. W. S. C. Copeman, Dr. C. W. Buckley, and Dr. F. M. Hilliard will sponsor the treatment of arthritis in the hospital, in the spa, and in the home respectively. In the section of nutrition and physical training Dame Louise McIlroy will discuss the dietary of the expectant and nursing mother, and Dr. Bernard Myers that of the infant and toddler. Mr. Leslie Harris, Sc.D., will speak on the assessment of malnutrition, and Dr. David Haler will describe laboratory aids to its assessment. Further particulars may be had from the secretary of the institute, 28, Portland-place, London, W.1.

Royal Society

Prof. J. J. Abel, M.D., director of the laboratory for endocrine research at the Johns Hopkins medical school, Baltimore, has been elected a foreign member of this society.

The National College of Physical Training

A site at Merstham in Surrey has been selected for this college, which is to be erected under the Physical Training and Recreation Act for the training of teachers and leaders. It consists of 220 acres on the Merstham Manor estate on the North Downs, being about a mile north of Merstham station and three miles from Redhill and South Coulsdon stations.

Demonstrations of Contraceptive Technique

On Thursday, June 2nd, at 2.30 P.M., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given at the C.B.C. Clinic by Mrs. Marie Stopes, D.Sc., and Dr. Evelyn Fisher. Medical practitioners and senior students should apply for tickets to the hon. secretary of the clinic, 108, Whitfield-street, London, W.1.

Appointments

BURT, H. A., M.B. Camb., Chief Assistant in Department for the Treatment of Chronic Rheumatic Diseases at the West London Hospital.

LYON, D. M., M.B. Edin., Assistant School Medical Officer and Assistant to the Medical Officer of Health for Brighton.

MAY, K. S., M.D., M.R.C.P. Lond., D.L.O., Senior Assistant Medical Officer (Grade I) at St. George-in-the-East Hospital (L.C.C.).

ROGERS, T. S., M.D., M.R.C.P. Lond., D.P.H., D.C.H., Assistant Medical Officer in the L.C.C. School Medical Service.

SMITHIES, BEATRICE M., M.R.C.S. Eng., D.P.H., Assistant Medical Officer in the L.C.C. School Medical Service.

WOODMAN, DOROTHY, M.D. Lond., Senior Clinical Pathologist in the department of preventive medicine of the University of Bristol.

London County Council.—The following part-time consultants and anæsthetists have lately been appointed:—

BROWN, A. I. P., M.B. Lond., D.A.;
COGSWELL, A. P. L., M.B. Lond.;
DAVIES, H. W., B.A. Oxon., L.M.S.S.A.;
DODWELL, H. B., B.Chir. Camb.;
EDWARDS, GEORGE, M.R.C.S. Eng., D.A.;
GOULD, R. B., M.B. Sheff., D.A.;
HADFIELD, C. F., M.D. Lond., D.A.;
HASLER, J. K., M.B. Lond., D.A.;
KERRIDGE, ALISON R., M.R.C.S. Eng., D.A.;
LANDAU, ERNEST, M.R.C.S. Eng., D.A.;
MACHRAY, ROBERT, M.B. Lond.;
MORRIS, L. H., B.A. Camb., M.R.C.S. Eng.;
PALMER, E. A. E., M.B. Camb., D.A.;
PRATT, F. H., M.R.C.S. Eng., D.A.;
SEYMOUR, E. A., M.B. Lond.;
VESSELL, V. E., M.R.C.S. Eng.;
WILLIAMS, MARIAN E., M.R.C.S. Eng.; and
TAYLOR, EDITH M., M.B. Lond.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I) or (II) = Assistant Medical Officer (Grade I or II):—

NIXON, W. C. W., M.D. Lond., F.R.C.S. Eng., M.C.O.G., Part-time Obstetrician and Gynæcologist, Fulham and St. Mary Abbots;
BATTEN, GRACE, B.M. Oxon., D.M.R.E. Camb., Full-time Radiologist, Fulham, St. Luke's, Chelsea, St. Mary Abbots, and St. Stephen's;
MACKAY, HELEN M. M., M.D., F.R.C.P. Lond., Part-time Consulting Pædiatrist, Queen Mary's, Carshalton and Downs (Children);
WILLIAMS, A. R., M.B. Liverp., Senior A.M.O. (II), Grove Park;
MCCREA, A. N., M.B. Camb., F.R.C.S. Eng., A.M.O. (I), Bethnal Green;
FAUX, NANCIE I., M.B. Lond., A.M.O. (II), Fulham;
COLLIN, J. O., M.B. Camb., A.M.O. (II), Highgate;
MILLAR, A. M., M.B. Melb., A.M.O. (II), Queen Mary's, Sidcup;
ROGERS, J. G., M.B. Liverp., A.M.O. (II), St. Charles';
MCCLELLAND, MARGARET, M.B. Melb., A.M.O. (II), St. Giles';
KENNEDY, J. P., M.B. N.Z., A.M.O. (II), St. Peter's;
HAYES, R. R. C., M.B. Melb., A.M.O. (II), St. Mary, Islington;
MURRAY, H. S., M.B. Glasg., A.M.O. (I), Park;
WHITE, EVA M., M.R.C.S. Eng., D.M.R.E., Part-time Consulting Radiologist, Queen Mary's, Carshalton;
NICHOLAS, F. G., M.B. Lond., D.M.R.E., Part-time Consulting Radiologist, Dulwich;
SEYMOUR, S. G., M.B. Irel., A.M.O. (I), St. Peter's;
MAY, QUEENIE I. E., M.B. Lond., A.M.O. (II), St. Mary, Islington; and
WOLFSON, L. J., M.R.C.S. Eng., A.M.O. (II), Lambeth.

Certifying Surgeon under the Factory and Workshop Acts: Dr. S. BEDFORD (Ulceby District, County of Lincoln).

Vacancies

For further information refer to the advertisement columns

Barry U.D.C.—Surgeon for Accident and Surgical Hosp., £800.
Bolton Royal Infirmary—Asst. Res. Surg. O., £200.
Bradford Children's Hosp.—H.S. and H.P., each £150.
Brighton, New Sussex Hosp. for Women.—H.S. and H.P., each at rate of £100.
Brighton, Royal Sussex County Hosp.—Hon. Clin. Asst. to Early Nervous Disorders.
Brighton Sanatorium and Infectious Disease Hosp.—Jun. Res. M.O., at rate of £250.
Brighton, Sussex Eye Hosp.—H.S., at rate of £150.
British Postgraduate Medical School, Ducane-road, W.—Three H.S.'s, each at rate of £105.
Bury St. Edmunds, West Suffolk General Hosp.—H.S. and H.P., £180 and £150 respectively.
Cambridge, Addenbrooke's Hosp.—Res. Anæsthetist and Emergency Officer, at rate of £130.
Cambridge University, Dept. of Medicine.—Three Assts. in Research to the Regius Professor of Physic, £600, £500, and £500.
Cardiff, King Edward VII Welsh National Memorial Assn.—Asst. Res. M.O. for South Wales Sanatorium, £200.
Carnarvonshire and Anglesey Infirmary, Bangor.—Jun. H.S., £120.
Charing Cross Hosp., W.C.—Asst. Obstet. Phys.
Chelsea Hosp. for Women, Arthur-street, S.W.—Surgeon. Also Jun. H.S., at rate of £100.
Cheltenham General and Eye Hosp.—H.P. and Two H.S.'s to Special Depts., each £150.
Chesterfield and North Derbyshire Royal Hosp.—H.S., at rate of £150.
Colonial Medical Service.—M.O. for Zanzibar, £600.
Connaught Hosp., Walthamstow, E.—Res. Surg. Reg. and Cas. O., at rate of £200 and £110 respectively.
Coventry City Joint Pathological Lab.—Asst. Pathologist, £500.
Derbyshire Education Committee.—Asst. School M.O., £500.
Dewsbury and District General Infirmary.—Second H.S., £150.
Doncaster, St. Catherine's Certified Institution.—Res. Med. Supt., £950.
Dreadnought Hosp., Greenwich.—H.P. and H.S., each at rate of £110.
Dundee, University College.—Full-time Asst in Dept. of Anatomy, £250.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.S. to Spec. Depts. and Cas. O., at rate of £120.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—Hon. Asst. Physician. Hon. Asst. Psychiatrist to Out-patient Dept. Also Med. Reg., £100.
Evelina Hosp. for Sick Children, Southwark, S.E.—Aural Surgeon, 50 guineas.
Golden Square Throat, Nose, and Ear Hosp., W.—Hon. Asst. Surgeon. Also Clin. Assts.
Grimsby and District Hosp.—Res. Orthopædic Officer, £225.
Halifax Royal Infirmary.—H.P., £175.
Herefordshire County Council.—County M.O.H., £1000.
His Majesty's Colonial Service.—Health Officer for Jamaica, £600.
Hosp. for Sick Children, Great Ormond-street, W.C.—Asst. Res. Surg. O., £100.
Hosp. for Women, Soho-square, W.—Hon. Clin. Assts. to Surgeons in Charge of Out-patients. Also Res. M.O., at rate of £100.
Huddersfield Royal Infirmary.—H.S. to Special Depts., at rate of £150.
Hull Municipal Maternity Home and Infants Hosp.—Jun. Res. M.O., at rate of £100.
Ipswich, East Suffolk and Ipswich Hosp.—H.S. to Orthopædic and Fracture Dept., £144.
King Edward Memorial Hosp., Ealing.—H.S., at rate of £150.
Lancaster Royal Infirmary.—H.S., at rate of £130.
Leicester City Mental Hosp., Humberstone.—Locum Tenens Asst. M.O., 8 guineas per week.
Leicester Royal Infirmary.—Res. Radiologist, at rate of £200.
Lincoln County Hosp.—Jun. H.S., at rate of £150.
Lincolnshire Joint Board for the Mentally Defective.—Temporary Superintendent.
Liverpool, County Mental Hosp., Rainhill.—Locum Tenens Asst. M.O., 8 guineas per week.
Liverpool Royal United Hosp.—H.P. and H.S., each at rate of £100.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Res. Medical Superintendent, £950. Also Asst. District M.O., £240.
London Homœopathic Hosp., Great Ormond-street, W.C.—H.S., at rate of £100.
London Hosp., E.—Med. First Asst. and Reg., £300.
London University.—University Chair of Radiology, £1500.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Ophth. H.S., at rate of £200.
Manchester, Ancoats Hosp.—Chief Asst. O. to Orthopædic Dept., £150.
Manchester Royal Infirmary.—Jun. Asst. M.O. in Radiological Dept. and Chief Asst. to Neuro-Surgical Dept., each £350.
Manchester, Victoria Memorial Jewish Hosp., Cheetham.—Hon. Gynæcological Surgeon.
Marie Curie Hosp., 2, Fitzjohn's-avenue, N.W.—Res. M.O., £100.
Mildmay Mission Hosp., Austin-street, E.—Asst. Cas. O. and Jun. Res. M.O., at rate of £125 and £100 respectively.
National Hosp. for Diseases of the Nervous System, Queen-square, W.C.—H.P., £100.
Newcastle-upon-Tyne Eye Hosp.—Hon. Ophth. Surgeon.
Northampton General Hosp.—Hon. Physician and Hon. Asst. Physician to Dept. of Psychological Medicine.
Norwich, Norfolk and Norwich Hosp.—H.S., £120.

Oxford, Radcliffe Infirmary.—Hon. Physician and Hon. Dermatologist. Also Surg. Reg., £100.
Pembroke County War Memorial Hosp., Haverfordwest.—Res. H.S., £200.
Plymouth, Mount Gold Orthopædic and Pulmonary Tuberculosis Hosp.—Res. M.O., £300.
Princess Elizabeth of York Hosp. for Children, Shadwell, E.—Out-patient M.O., at rate of £175. Also H.S., at rate of £125.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—H.P., at rate of £120.
Putney Hosp., Lower Common, S.W.—Res. M.O., £150.
Queen's Hosp. for Children, Hackney-road, E.—H.P., at rate of £100. Also Ophth. Surgeon and Vacancy in Dept. of Psychological Medicine.
Royal London Ophthalmic Hosp., City-road, E.C.—Pathologist and Curator, £200. Also Refraction Asst. to L.C.C. School Dept., £160.
Royal Naval Medical Service.—Medical Officers.
Royal Society of Medicine, 1, Wimpole-street, W.—Norman Gamble Fund and Research Prize, £50.
St. Albans, Hill End Hosp., &c.—H.P., at rate of £165.
St. George's Hosp., S.W.—Res. Anæsthetist, at rate of £100.
St. Helens Hosp., Lancashire.—Sen. H.S., £225.
St. John Clinic, &c., Ranelagh-road, S.W.—Med. Reg., £200.
St. Mark's Hosp. for Cancer, &c., City-road, E.C.—H.S., at rate of £120.
St. Mary's Hosp., W.—Third Asst. Pathologist, £250. Also Anæsthetist in Dental Dept., £1 per session.
St. Mary's Hosp. for Women and Children, Plaistow, E.—Res. Surg. O. and Res. H.P., at rate of £155 and £150 respectively.
St. Paul's Hosp. for Urological and Skin Diseases, Endell-street, W.C.—H.S., at rate of £100.
St. Peter's Hosp. for Stone, Henrietta-street, W.C.—Clin. Assts. to Hon. Staff.
Salford Royal Hosp.—Two H.S.'s, each at rate of £125.
Salvation Army, Mothers' Hosp., Lower Clapton-road, E.—Sen. and Jun. Res. M.O.'s, at rate of £150 and £80 respectively.
Sheffield, Jessop Hosp. for Women.—Sen. Res. Officer and H.S., at rate of £150 and £100 respectively.
Sheffield Royal Infirmary.—Clin. Asst. to Ophth. Dept., £300. Also Ophth. H.S., at rate of £150.
Sheffield University.—Demonstrator of Anatomy, £300.
Shrewsbury, Royal Salop Infirmary.—Res. H.S., at rate of £160.
South London Hosp. for Women, Clapham Common, S.W.—H.P. and H.S., each at rate of £100.
Southwark Metropolitan Borough.—Part-time Asst. Tuber. O., £350.
Sudan Medical Service.—Vacancy, £E720.
Sunderland County Borough Mental Hosp.—Med. Supt., £1000.
Sunderland Royal Infirmary.—H.P., £120.
Tilbury Hosp.—H.S., at rate of £140.
Wakefield Mental Hosp.—Asst. M.O., £350.
Warlingham Park Hosp., Surrey.—Sen. Asst. M.O., £600.
Warneford Hosp., Oxford.—Physician Supt., £1000.
Westminster Hosp. Annexe, 66, Fitzjohn's-avenue, Hampstead.—Radiologist.
West London Hosp., Hammersmith, W.—Two Cas. O.'s, each £250. Also H.P. and Two H.S.'s, each at rate of £100.
Weston-super-Mare Hosp.—Res. H.P., £150.
Willesden General Hosp., Harlesden-road, N.W.—Hon. Clin. Assts. to Out-patient Dept.
Winchester, Royal Hampshire County Hosp.—Res. Surg. O., at rate of £200.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Taunton (Somerset) and Tyldesley (Lancs).

Medical Diary

May 30th to June 4th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY.

Pathology. 8.30 P.M. (National Institute for Medical Research and Imperial Cancer Research Fund Farm Laboratories, Mill Hill, N.W.). J. Argyll Campbell: (1) Mouse Liver with ? Inclusion Bodies. (2) Mouse Lung Cancer with Metastases. Sir Edward Mellanby: (3) Experimental Production of Deafness in Young Animals. A. S. Parkes: (4) Effects of Hormones on the Fowl. R. Knox: (5) Lesions Produced in Rats by Woglom's Pyogenic Virus. J. E. Barnard: (6) Microscopical Demonstration of Woglom's Virus in Rat Lesions. W. Cramer and E. S. Horning: (7) Pituitary Changes Produced by Œstrin. L. Foulds: (8) A Transplantable Guinea-pig Carcinoma Produced by Thorotrast. R. J. Ludford: (9) The Growth Characteristics of Some Filterable and Non-filterable Fowl Tumours in Tissue Cultures. (10) The Action of Leucocytes ("trephones") on the Growth of Fibroblasts *in vitro*.

WEDNESDAY.

Surgery. 2.15 P.M. (Addenbrooke's Hospital, Cambridge). Dr. L. B. Cole: Tetanus. Dr. A. S. Griffith: Bovine Tuberculosis.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

WEDNESDAY.—8.30 P.M. (Kensington Town Hall), Sir William Willcox: Toxicology with reference to its Criminal Aspects. (Cavendish lecture.)

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY.—5 P.M., Prof. F. R. Fraser: The Clinical Aspects of the Transmission of the Effects of Nervous Impulses by Acetylcholine. (Last Croonian lecture.)

UNIVERSITY OF LONDON.

MONDAY and WEDNESDAY.—5.15 P.M. (University College, Gower-street), Prof. F. Weidenreich: *Sinanthropus pekinensis.*

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.

TUESDAY.—4.30 P.M., Dr. H. Gardiner-Hill: Diseases of the Ductless Glands.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. G. A. D. Haslewood, D.Sc.: The Cerebro-spinal Fluid. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Prof. J. C. Drummond, D.Sc.: Practical Aspects of Modern Vitamin Research
THURSDAY.—2.15 P.M., Dr. Duncan White: radiological demonstration.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

ST. MARY'S HOSPITAL, W.

TUESDAY.—5 P.M. (Institute of Pathology and Research), Prof. Matthew Stewart: Some Aspects of the Silicosis Problem.

ST. GEORGE'S HOSPITAL, S.W.

MONDAY.— 5 P.M., Sir Frederick Hobday: A Comparison of Diseases in Animal and Man. (First of six lectures.)
THURSDAY.—5 P.M., Dr. E. Guttmann: psychiatric demonstration.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY.—2 P.M., Sir Lancelot Barrington-Ward: Peritonitis. 3 P.M., Dr. R. T. Brain: Ringworm.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY to SATURDAY.—CHELSEA HOSPITAL FOR WOMEN, Arthur-street, S.W., all-day course in gynæcology.—BROMPTON HOSPITAL, S.W., Tues. and Fri., 5.15 P.M., M.R.C.P. course in chest diseases.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W., Tues. and Thurs., 8 P.M., clinical and pathological M.R.C.P. course.—LONDON CHEST HOSPITAL, Victoria Park, E., Wed. and Fri., 6 P.M., M.R.C.P. course in heart and lung diseases. (Open only to members of the fellowship.)

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.

WEDNESDAY.—4 P.M., Dr. C. P. Symonds: The Clinical Significance of Headache.

Births, Marriages, and Deaths

BIRTHS

ABERCROMBIE.—On May 23rd, at Fitzjohn's-avenue, Hampstead, the wife of Dr. G. F. Abercrombie—a daughter.

BALDWIN.—On May 14th, at Edinburgh, the wife of Dr. John T. Baldwin—a daughter.

WOOD-SMITH.—On May 19th, at a London nursing-home, the wife of Dr. F. G. Wood-Smith—a daughter.

MARRIAGES

CURRAN—GOTHARD.—On May 21st, at St. Paul's, Knightsbridge, Desmond Curran, F.R.C.P., to Marquerite Claire, only child of Mr. Claude Gothard, of Beckenham, Kent.

KERSHAW—GUY.—On May 18th, Kenneth Clifford Kershaw, M.R.C.S., Tattenhall, Cheshire, to Jessie Louise Guy, Rushall, Walsall.

LEVIS—TALL.—On April 23rd, at St. Andrew's Church, Kowloon, Hong Kong, Lieut. Derek George Levis, M.B., R.A.M.C., to Doris Constance Tall, niece of Mr. T. Young Simpson, F.R.C.S.

PILKINGTON—VON WESTHOVEN.—On May 21st, at St. John's Church, Merrow, Francis Edward Pilkington, M.R.C.P., to Elizabeth, elder daughter of the late General Eduard von Westhoven.

DEATHS

ANDERSON.—On May 22nd, at Hyde Park-gate, S.W., Colonel John Anderson, C.I.E., M.B. Edin., late I.M.S., aged 83.

BENNETT.—On May 21st, Colonel Vivian Boase Bennett, F.R.C.S. Eng., I.M.S. (retired), of Castletown, Isle of Man.

CASE.—On May 20th, at Southsea, Hugh Martin Case, M.R.C.S. Eng., of Fareham, Hants.

WARD.—On May 22nd, at Ipswich, Frank Fowler Ward, M.B. Camb.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

APPENDICITIS THIRTY AND FORTY YEARS AGO*

BY G. L. THORNTON, M.C., T.D., M.A., M.R.C.P.
COLONEL (T.A.), RETIRED

THE material used in the preparation of this address has been drawn mainly from published reports of the proceedings of the Devon and Exeter Medico-Chirurgical Society during an association dating back to 1902. My object in resurrecting matter engaging our interest twenty-five to forty years ago and more has been to see how far modern progress in diagnosis and treatment, and in the technique associated with these, would have affected the end-results obtained at those distant dates.

In the change of outlook that has taken place since the war we have but shared in an experience common to every department of our life. In our own case the spread and perfecting of specialism, the rapid growth in the insurance and health services, and better facilities for the transport of the sick to hospital have combined to cause an easing of personal responsibility. Summed up with little need for metaphor we seem to see in the post-war era the transition from manual to mechanised medicine.

* * *

Just thirty years ago the society was indebted to Mr. A. C. Roper for a very instructive and dramatic paper with the title: The Last Chance—does it still exist? At that date the loss of time in travelling and the absence of any special transport for the sick, very often meant delay in obtaining consultative advice or removal to hospital. The result was a "wait and see" attitude in abdominal conditions very different from the "open and see" policy that followed. Mr. Roper was expounding the advantages of the more radical outlook, and he urged that where any suspicion of an intra-abdominal catastrophe arises—be it perforation, hæmorrhage, or internal strangulation—the longer operation is delayed the greater is the danger until at last a stage is reached where operation itself is unjustifiable. This view will find none to challenge it to-day; it is however in the attitude towards appendicitis that senior members of the society must have observed oscillation of the pendulum.

Looking back forty years one remembers the "quiescent interval" in which it was hoped recovery would take place—as indeed it often did. In the less favourable case there was the waiting for the inflammatory area to be shut off and for an abscess to be opened in the right iliac fossa about the second week. Many of these, alas, did not progress according to expectation, and operation was performed at a time when the "last chance" had wellnigh ceased to exist. In the cases operated upon for abscess the after-progress was often slow and wearing to the patient. In many instances, beyond the portion of appendix evacuated with the abscess no further removal could be attempted. In some of these there was recurrence of abscess at a later date, or more immediate complications such as perforations into the bladder, vagina, or rectum; perirenal abscess and empyema were not unknown as later incidents.

Mr. Roper, in support of the early operation, quoted the following figures of Mr. A. H. Burgess of Manchester, published in the *British Medical Journal* in January, 1908:—

		Cases.	Deaths.
Operation where symptoms were found—	under 24 hours	7	0
	24 to 48 „	9	0
	on third day	14	0
	on fourth „	15	0
	on fifth „	10	2
	on sixth „	6	2
	on seventh „	5	1
	second week	21	3
	third „	13	1

In commenting he mentioned a conversation he had had with Mr. Mayo Robson of Leeds some years prior to 1908, in which the latter had said, "I have often had to regret that my operation was too late; never that it was too early."

One remembers also the period when a daily blood count was taken as a guide. It was by no means always a certain one—as for instance when a previous attack with adhesions circumscribed the inflammation.

I say this, however, without prejudice to an investigation whose value cannot be over-estimated in any routine clinical examination; for to the hæmacytometer, as to the hand-centrifuge in the microscopical examination of urinary deposits, many an obscure case owed solution at a time when special laboratory facilities were not at our door.

Four years earlier Mr. Russell Coombe had opened a discussion and without committing himself one way or the other had given the indications for immediate operation as opposed to awaiting a quiescent interval. These were: (1) in acute cases where reasonable doubt existed as to localisation; (2) a belief that pus has formed; and (3) the existence of peritonism.

How far we were influenced by that address from Mr. Roper, or to what extent there was general amendment in surgical opinion is uncertain; but the practice arose of calling in the surgeon at the earliest possible moment wherever appendicitis was seen or suspected. Nor did we find occasion for subsequent regret in the part we had taken in precipitating operation. The late Mr. Brennan Dyball, who was becoming known to us at this period, had no misgivings on the subject, as indeed was his opinion clear on so many problems where others might see cause for halting.

A few years ago it seemed that again some hesitation was taking place as to immediate operation in appendicitis; but a surgical friend tells me that the pendulum had merely quivered, and that it now stands firm. This seems only reasonable when we consider a condition where so much uncertainty and potential danger is concealed from view. I remember on more than one occasion our old friend Dr. Langridge of Ilfracombe reminding us of "the writing on the abdominal wall"; but I venture to think that even the greatest Daniel amongst us may fail to interpret the message correctly in every case of appendicitis.

* Part of a valedictory address entitled Some Bygone Numbers in the Light of To-day, delivered before the Devon and Exeter Medico-Chirurgical Society on the completion of 27 years' service as reporting honorary secretary (March 31st, 1938).

THE GROWTH OF NAILS

IN the department of human anatomy at Oxford Prof. W. E. Le Gros Clark and Dr. L. H. Dudley Buxton have been making observations on the growth of finger-nails in normal adults and children (*Brit. J. Derm.* May, 1938, p. 221). It seems that

covariance between the nail-growth of one digit and that of all the others is high, that the growth of the nail on the third digit is consistently greater than that of the others, while the little finger-nail is consistently the least rapidly growing. The thumb-nail apparently grows slightly less rapidly than those of the index and ring-fingers. As might be expected, finger-nails grow more rapidly in summer than in winter, and the habit of nail-biting also accelerates growth. On the negative side, these observers found no difference in rate of nail-growth between the right and left hand and no variation of growth with age between the ages of 10 and 23.

FRIENDLY HELP

ALL of us need help sometimes and we find it difficult to have to ask it of strangers. It is the claim of the Ladies' Guild of the Royal Medical Benevolent Fund that their beneficiaries are made to feel they are being helped by friends who take a real interest in their welfare. The twenty-eighth annual report of the Guild tells of another year's work during which 526 people were helped. In addition to the £3477 distributed, 500 orders for coal were issued and 584 parcels of clothes were sent out. Seven new branches have been opened, and the treasurer reported a slight increase of income which enabled the Guild to cope with an increased number of requests for help. The reports of the various committees show how intelligent giving can increase the value of the gift. Coöperation with other organisations, for example, often makes it possible to arrange a really constructive scheme to help a beneficiary, which the Guild could not have carried out alone. This is perhaps most easily seen in the work among the young people. The education and training section last year helped 27 boys and 40 girls in schools all over the country, and 7 boys, 13 girls, and 1 widow were also given the chance to train in self-supporting careers. Those who read this report will feel that the Guild is certainly fulfilling its aim to bring back independence to those who are young enough to have an independent future and to give friendship and some measure of comfort to the old and infirm. Those who cannot offer any other form of gift can surely spare clothes, discarded while still in good condition. These should be sent to the clothes room of the Guild, Tavistock House North, Tavistock-square, London, W.C.1.

RECREATION IN INDUSTRY

IT is a vexed question whether the interests of health and recreation are better served by employers providing sports facilities or by the community allotting the necessary space and equipment to be used by groups of workers at fees provided in whole or in part by their own sports clubs. Obviously where space is limited the multiplication of private clubs may be wasteful; community sports centres could allot more equitably the available accommodation. The question of Sunday opening, which so vexes small clubs and many sports associations in industry, might be more readily solved within the larger unit, although one knows of areas where the public grounds are closed and the private grounds are open. By whatever method sports facilities are organised the essential thing is to benefit the greatest number of people, and provided this is borne in mind the method is of secondary importance. Credit should however be given to industrial concerns which have, in many cases at considerable outlay, contributed to the country's sports facilities. It has been a piece of first-rate public hygiene and the next step is to fuse private and public effort into an effective and widespread system. To this end the Industrial Welfare Society has brought out an attractive booklet entitled Recreation in Industry (18, Hobart-place, London, S.W.1. 1*s.*). It is a good example of the wedge of private enterprise driving a channel for the full flow of public effort. Apart from the actual provision of equipment, no one has any doubt that works sports clubs should be widely encouraged; the more numerous and the more varied the better, making use at a small fee of publicly provided equipment. The country should not be covered with a host of little sports fields which are allowed to remain idle when schools and other institutions could be using them. Swimming baths, holiday hostels, riding clubs, and a variety of other expensive recreations can only be widely enjoyed when resources are pooled or when the community provides the equipment which local clubs can hire. The business of providing recreational facilities demands large-scale planning and the booklet is a very interesting commentary on the amount of coördination that is still necessary.

HARLOW BROOKS

IN an age of specialism there are probably many who regret the passing of the old-fashioned general physician whose place has been so largely taken by the team of experts. Harlow Brooks, the subject of a biography [1] by his friend, Dr. John J. Moorhead, belonged to, and adequately represented, a type of consultant with which, fortunately, we have not yet grown unfamiliar in this country. A man of wide rather than narrowly specialised medical education and knowledge, energetic, conscientious, and bonhomous, he was profoundly interested in sick humanity and never spared himself in its service. For forty years he was an outstanding figure in the New York medical world and this book, the writing of which has obviously been a labour of love, will appeal to medical readers not because it tells a story of extraordinary medical ability and experience, but rather because it portrays a physician of a particularly sound and lovable kind.

BRUSH UP YOUR HEALTH

SMALL chatty books on health are now so common that it is easy to make the mistake of ignoring an exceptional one.[2] Though Dr. Clegg makes his subject amusing he does not make it too simple; there is no aura of "told to the children" about it. He seems to have decided that if people want to know about their health they had better realise from the start that the subject is complicated, and that a great many facts must be taken in and assimilated. He sets about giving those facts so precisely, and yet so pleasantly, that the reader finds himself taking the trouble to understand them before he knows he has been lured into a laborious task. He is full of sound advice about diet, about the care of the eyes and teeth, and the dangers (and delights) of tobacco and alcohol. His summary of the principles of self-analysis (under the title "On bringing up yourself") is masterly considering the short compass into which it is compressed, and full of common sense. He does not see us—even the best of us—as well-meaning angels, overthrown by circumstances. "You are, of course," he says, "an over-inhibited and repressed savage. It is really only but a short time ago that you were pursuing your next cave neighbour with the laudable intention of cracking his head; and there was still the evening meal to kill in order to celebrate the event. . . . An emotion well under way needs for its satisfaction expression in muscular activity. Anger should logically (and psychologically) end up in a well-planted blow. Hate needs a little homicide to keep it quiet." He goes on to praise the advantages of ball games as an outlet for aggression. "Is not the golf ball a convenient symbol for the head of the man who did you such a dirty deal last week?" He ends with a most encouraging chapter urging us to get back to Methuselah and live longer lives; which, it seems, we are quite capable of doing if we will only give our minds to it.

[1] Harlow Brooks, Man and Doctor. By John J. Moorhead, M.D. London: Harper and Bros. 1937. Pp. 302. 10*s.* 6*d.*

[2] Brush Up Your Health. By H. A. Clegg, M.A., M.B., M.R.C.P., with a preface by Lord Horder, G.C.V.O., M.D. London: J. M. Dent and Sons, Ltd. 1938. Pp. 119. 2*s.* 6*d.*

DESTRUCTION OF RABBITS WITH VIRUS

INFECTIOUS myxomatosis of rabbits was described by Snarelli as early as 1898 when it broke out among his laboratory rabbits in Montevideo. The disease is severe and usually fatal to members of the genus oryctolagus, though other animals appear insusceptible to it. Experiments with the virus carried out a few years ago by Sir Charles Martin, F.R.S., on rabbits in grassed compounds suggested that a virulent strain was remarkably stable and that the very few animals which recovered did not transmit immunity to their offspring. The use of the disease as a means of controlling rabbit populations is examined by A. N. Worden in the Animal Year Book,[1] but cannot be unreservedly recommended. H. O. Schmit-Jensen of the State Veterinary Serum Laboratory, Copenhagen, who is in charge of an island experiment not yet completed, writes that "the procedure is an extremely economical one but I ought to say that I do not find it as humane or æsthetic as could be desired." Another observer who is also in charge of an island experiment considers that on waste-land, such as islands or cliffs, where it is uneconomic to pay men to catch rabbits, the use of the virus is justified because it causes a less painful and quicker death (8–16 days) than the slow starvation which every winter brings on these sites. The 1937 report of the Skokholm Bird Observatory describes an unsuccessful attempt to eradicate with the virus the wild rabbits on this island off the Pembrokeshire coast. Three times at intervals of months infected rabbits were released, and though for a while the disease was observed to spread, and it is admitted that almost all the infected rabbits died, there were always some, even in heavily infected areas, which remained immune. At the time the report was written the rabbit population seemed as large as ever and the virus appeared to have died out altogether from the island.

AFTER DINNER REST AWHILE?

IN 1909 five members of our profession, including Sir Thomas Barlow and Sir William Hale-White, started a correspondence in the *Times* by saying that "school and cross-country races exceeding one mile in distance are wholly unsuitable for boys under the age of nineteen, as the continued strain involved is apt to cause permanent injury to the heart and other organs." In the discussion that followed among medical officers of schools, the majority agreed with Sir Clifford Allbutt, who declared he had never had reason to suppose that any particular harm had been done by exercise.[2] This is still the general opinion, and nowadays the discussion rather turns on what and when a boy should eat before the race. Mr. M. C. Nokes [3] extols the virtues of "full-sized helpings of Irish stew and boiled potatoes, followed by suet pudding and golden syrup" at a meal finishing an hour and a half before the contest. The consumer of this fare, he says, finished seventh out of a field of 46 starters in the Ledbury run at Malvern College, which may be regarded as one of the stiffer of the public school cross-country runs. Two of Mr. Nokes's colleagues have countered by pointing out that all the competitors who finished in the first five places consumed a very light luncheon, consisting of either a small portion of fish or a poached egg; but on the other hand Mr. Montague relates that twenty years ago he won the Crick run at Rugby, which is something over 12 miles, after eating precisely the same meal as Mr. Nokes's boy, with the sole difference that he had two helpings of each dish, enjoyed the meal and the race, and rounded off the afternoon by consuming seven oranges. The *Rugby School Meteor* records that a high wind was blowing; otherwise the record of 1 hr. 12 min. 12 sec. might have been broken by Montague, who took 57 sec. over that time.

[1] Animal Year Book, 1938, vol. v, p. 75 (published by the University of London Animal Welfare Society, 42, Torrington-square, W.C.1, 2s. 6d.).

[2] See jubilee report of Medical Officer of Schools Association, 1934, p. 34. [3] *Times*, March 26th, 1938, p. 8.

No wonder we still talk with envy of the schoolboy's digestion. Although, in almost all schools, football, cricket, or hockey are not played until at least an hour after the end of dinner, the keenest boys rush from their meals and are often playing squash racquets within a quarter of an hour of finishing the meal. A sustained game of squash lasting half to three-quarters of an hour can be as exhausting as an ordinary game of Rugby football; yet no apparent harm seems to come of this practice and it is argued that these habits of boys do no damage to them either then or later.

A great deal depends on habit, and the observations of Campbell and his assistants [4] upon the influence of exercise on digestion show how important the effects of "training" may be. They estimated the emptying-rate of the stomach and the secretion of gastric juice during rest and after varying degrees of exercise, and found that though severe exercise always delayed the rate of emptying and inhibited the secretion of juice, the amount of activity needed to bring this about depended on the men's fitness. Light exercise such as walking did not delay the secretion of gastric juice, and it increased the rate of emptying, especially when the walk was a pleasurable one with a friend. Although in one of their subjects walking quickly for an hour was enough to delay digestion, in another, whose habit it was to run several miles a day, running two miles was not enough. As the meals had to be withdrawn through a Ryle's tube, they were not "solid," and would certainly not have satisfied the ordinary schoolboy's appetite. Exercise that produced no discomfort helped digestion, while exercise that caused discomfort hindered it.

RELIEF IN PROSTATIC ENLARGEMENT.—Messrs. Mottershead and Co. (7, Exchange-street, Manchester, 2) have submitted a contrivance for the passage of a weak electrical current through the enlarged prostate in elderly patients. It consists of two dry-cell batteries connected by leads, with one electrode to be inserted in the rectum, the other to receive the glans penis. Evidence has been offered that a continuous current of this kind may reduce the spasm of the sphincter and relieve discomfort. The price of the apparatus is £5.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED MAY 14TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 1; scarlet fever, 2154; diphtheria, 998; enteric fever, 14 (27 "expected"); pneumonia (primary or influenzal), 1188; puerperal pyrexia, 179; cerebro-spinal fever, 29; acute poliomyelitis, 5; encephalitis lethargica, 7; dysentery, 49; ophthalmia neonatorum, 95. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 20th was 4504, which included: Scarlet fever, 843; diphtheria, 1070 (carriers 53); measles, 1364; whooping-cough, 275; puerperal fever, 14 mothers (plus 8 babies); encephalitis lethargica, 281; poliomyelitis, 1. At St. Margaret's Hospital there were 24 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 28 (11) from measles, 3 (1) from scarlet fever, 20 (6) from whooping-cough, 32 (8) from diphtheria, 47 (16) from diarrhœa and enteritis under two years, and 54 (11) from influenza. The figures in parentheses are those for London itself.

Southend-on-Sea reported the only death from typhoid. Measles proved fatal in 17 great towns, Gateshead having 2 deaths, no other great town more than 1. Birmingham reported 6 deaths from whooping-cough, Liverpool 2. Diphtheria was fatal in 19 great towns, Liverpool reporting 3 deaths. The number of stillbirths notified during the week was 309 (corresponding to a rate of 42 per 1000 total births), including 39 in London.

[4] Campbell, J. M. H., Mitchell, G. O., and Powell, A. T. W., *Guy's Hosp. Rep.* 1928, 78, 279.